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IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 9.] May, 1939. [No. 5.

DISEASES CAUSED BY BACTERIA AND FUNGI

KAARDE, J. (1937). Die Euterentzündungen der Kühe und deren Behandlung. [**Mastitis and its Treatment**].—*Ref. III Balti. Valsty. vet. Kongr. 1937.* pp. 40-57. 3 tables. [In German : Russian summary].

In Estonia various forms of mastitis amount to about 15% of the cattle diseases officially observed. Bacteria of the *coli-aerogenes* group are said to account for 53·23% of cases in Lithuania, 53·35% in Latvia, and 38·66% in Estonia. The other causal agents, in order of importance, are mastitis streptococci, micrococci, *Corynebact. pyogenes*, *Mycobact. tuberculosis*, and *Brucella abortus*. Streptococcic mastitis is wide-spread in Estonia. Examination of 146 cows on nine farms revealed a 26·7% infection with streptococci. TB. of the udder was observed in only 0·5% of slaughter cattle found to be tuberculous.

—A. PABIJANSKAS (KAUNAS).

EL-GHERIANY, M. G. (1938). La fréquence de la mammite streptococcique chez les bovins d'Egypte. [**Bovine Streptococcal Mastitis in Egypt**].—*Bull. Off. internat. Epiz.* **16.** 244-248. [5 refs.]

Mastitis is now being encountered in Egypt mainly due to importation of stock. Out of 305 cows examined by the leucocyte count and Hotis test, and bacteriologically, two were affected with streptococcal, and two with staphylococcal mastitis. No cases were found among 294 buffaloes.—P. S. WATTS.

LESBOUYRIES, & BERTHELON. (1938). Mammite staphylococcique de la chienne. [**Staphylococcal Mastitis in the Bitch**].—*Rec. Méd. vét.* **114.** 610-615. 2 tables.

The symptoms and lesions of the disease are described. They are those typical of gangrenous mastitis. Death may occur in 2-5 days, or after sequestration of the affected part recovery may occur. A chronic condition is also observed. Diagnosis can easily be made clinically or bacteriologically.

Treatment with sulphamide derivatives is said to have been successful in less acute cases. Local treatment is also necessary.

A comparison is made between the staphylococcus isolated from the disease in the bitch, and the organism of NOCARD from the disease in goats. NOCARD's

strain is the more toxic. Cross-immunity experiments indicated the close relationship of the two strains.—F. H. MANLEY.

BEÜMER, J. (1938). L'action du sérum de cheval normal sur la staphylotoxine. [**Effect of Normal Horse Serum on Staphylococcus Toxin**].—*Ann. Inst. Pasteur.* **61.** 54-71. [15 refs.]

B. studied the inhibitory power of horse serum on the production of staphylococcus toxin. It was found that horse serum incorporated in the medium only had an inhibitory effect on the toxin production of certain strains. Strains of staphylococci which were able to produce toxin in the presence of horse serum were also proteolytic, and he suggests that this proteolytic power denatures the protein, rendering it inactive.

No actual protective action by horse serum, such as by coating the red blood corpuscles, could be demonstrated in haemolysin tests. B. regards the fact that this inhibitory action could be shown against the haemolysin, leucocidin and cytolysin of susceptible strains as further evidence that these effects are only different aspects of the same toxin.—D. L. HUGHES.

LE GENTIL, P. (1938). Action comparée du pouvoir immunisant de l'antivirus et de l'anatoxine staphylococcique administrés par différentes voies. [**Comparative Immunizing Powers of Staphylococcal Antivirus and Anatoxin Administered by Various Routes**].—*Thesis, Alfort.* pp. 95. 10 figs. [Numerous refs.]

After a review of the preparation, properties and uses of staphylococcal anatoxin and antivirus, the author describes experiments on the immunizing power of these preparations, using a very virulent strain of *Staphylococcus aureus* as test organism. The strain was first titrated for pathogenic power by several intradermal injections of graded dilutions of a 24-hour peptone broth culture. Several pairs of rabbits were then inoculated by various routes at weekly intervals with four separate immunizing agents :– a French anatoxin, an American toxoid, a stock antivirus and an autogenous antivirus. The first two conferred a general and local immunity and the last two a local immunity only.—R. O. MUIR.

RIEDMÜLLER, L. (1937). Einiges über den Milzbrand bei Mensch und Tier in der Schweiz. [**Anthrax in Man and Animals in Switzerland**].—*Schweiz. med. Wschr.* **18.** 158-159. 1 fig., 2 tables. [4 refs.]

R. traces the history of anthrax in Switzerland from 1894. During the last ten years there have been fewer than 200 (usually not much above 100) cases of anthrax in animals annually, and there were only 15 cases of human anthrax over the whole of the same period. R. believes that animal anthrax in Switzerland is at present due in part to infection from imported foodstuffs.—J. E.

TABUSSO, M. E. (1938). Vacuna anticarbonosa glucosidada. [**Glucoside Anthrax Vaccine**]. pp. 19. [13 refs.] Lima, Peru : Ministerio de Fomento.

After a short review of different anthrax vaccines, T. reports the results obtained both in experimental and field conditions during eight years' work on glucoside anthrax vaccine. This vaccine is satisfactory when it is prepared with a 1% saponin solution, using attenuated anthrax bacilli. In cattle, goats, horses and sheep in highly infected areas receiving one inoculation with this vaccine, there was a considerable decrease in mortality from anthrax. T. asserts that the glucoside vaccine undoubtedly provides an effective and solid immunity for at least ten months.

ANON. (1937). Proyecto de reglamento contra el carbunclo bacteridiano. [**Proposed Regulations for the Control of Anthrax**].—*Bol. mens. Direcc. Ganad., Montevideo.* **21.** 658-668.

By the principal clauses, owners, laboratories and medical authorities would be required to declare suspected cases. Visits would be made to infected premises and samples of suspected hides, etc., might be taken. In positive cases the premises would be isolated and all stock would be vaccinated, no animals being removed until 15 days after vaccination or after the last case of anthrax. Isolation would not be insisted on where the owner had declared that the existence of infection was suspected or had submitted material for examination. In this case the premises would be declared " infected ", and 20 days allowed for vaccination of all susceptible animals. Animals for immediate slaughter would be allowed off the premises after veterinary inspection, and provided there had been no case of anthrax within the preceding ten days. Vaccination would be done by the official veterinarian, or under his supervision. The control of vaccines would be compulsory and a monthly declaration of sales, doses, etc., would be demanded from the manufacturers or retailers. Animals not vaccinated against anthrax would be excluded from dairy herds, and annual vaccination would be carried out in the summer months (September to April). Animals intended for entry into supervised dairy herds would be vaccinated at least 15 days before entry. Yearly vaccination of stock would be provided for, on premises declared infected or isolated, until three years had elapsed from the date of the original outbreak, and also the sampling of hides in hide cellars. Incineration and other methods of destruction of anthrax or suspected anthrax carcasses would be provided for, the skinning of such carcasses being forbidden.—A. H. HUNTER.

PIGOURY, L. (1938). Les suites immédiates de la vaccination anti-charbonneuse des équidés par le méthode intradermique en un temps. Etiologie et pathogénie des réactions vaccinales. [**Immediate Reactions in Intradermal Anti-Anthrax One-Dose Vaccination of Horses**].—*Rev. vét. milit.* **22.** 153-161. 3 tables. [12 refs.]

Statistics are given of the vaccination of 63,000 army horses and mules in the Levant from 1928 to 1936. Inoculations were first performed with the Pasteur double vaccines. Later single-dose vaccines prepared respectively by the Pasteur Institute, Paris, and by the Morocco laboratory were given intradermally. The statistics illustrate a decreasing incidence of local and general reactions, as well as varying breed sensitivity to the Pasteur double vaccine. The total average proportion of severe reactions was approximately 0·1% with the Pasteur Institute single vaccine, and less than 0·3% with the Moroccan. The reactions, seldom more than a local oedema from the third to the 12th day, were much less frequent and serious than those due to the Pasteur double vaccine. Apart from racial sensitivity, the virulence of the vaccine determined the frequency and intensity of reaction. P. urges caution in the use of glucoside and lanoline vaccines.—R. O. MUIR.

I. DAVIDSON, F. A. (1938). **Bovine Tuberculosis and the Value of Routine Herd Inspections.**—*Vet. Rec.* **50.** 109-116. 1 appendix. [6 refs.]

II. TORRANCE, H. L. (1938). **The Detection of the Cow Suffering from Udder Tuberculosis.**—*Ibid.* 116-119.

III. ALLAN, H. B. (1938). **A Brief Survey of the Results of some Preliminary Tuberculin Tests in Dairy Herds.**—*Ibid.* 119-120.

I. D. points out that the great value of routine herd inspection is in the detection of the number of cases which come within the meaning of the Tuberculosis Order. In his opinion the samples of milk taken should be sent for biological

examination to the County Bacteriological Laboratory, since it interferes greatly with the veterinary inspector's work to spend time in the laboratory, owing to the hours at which milking is carried out at the farms. Samples should be taken soon after the cows have been milked, and not only from the affected quarter, but from the other quarter on the same side, or even from all four quarters.

He is of the opinion that the examination of bovine sputum, although providing a means of detecting infected cattle, is not of much importance in the detection of sources of infection directly responsible for human infection and that the infection of bulk samples of milk is not reduced to any appreciable extent by the slaughter of pulmonary cases of TB., but that the early removal of tuberculous mastitis cases does affect the number of TB.-infected samples found. Eradication can be carried out by rearing calves on non-infected milk and keeping them separated from the infected herd and using them as recruits to the breeding herd. The mere slaughter of cases of tuberculous mastitis does not materially affect the incidence of TB.

II. T. is of the opinion that the veterinary inspector should carry out the microscopic examination of milk as soon as possible after the sample is taken, but that the taking of individual samples should also be covered by the taking of bulk samples for g. pig inoculation test. In-calf " dry " cows should be included in herd inspection, which should take place four times a year.

III. This is a survey of " flying " herds, " mixed " herds and " breeding " herds in Durham.

In " flying " herds tested for the first time, an average of 42% were found to be reactors, varying from 18% in calves to 26-75% in adult dairy stock.

In " mixed " herds, comprising adult stock and young animals, the average percentage of reactors was 29·3 ; in the adult stock the highest was 54·3%. The average percentage of reactors in the adult cattle was 42·5.

In " breeding " herds, of which 18 were tested, the percentage of reactors was 3·6, although in one herd tested the percentage of reactors was as high as 26·1. The young stock and the first-calf heifers were practically free in all the herds.

A. is of the opinion that many clean herds could be found among " breeding " herds, if farmers would only decide to have the herds tested.—BRENNAN DEVINE.

KRAUSE, C. (1938). Ueber den Ablauf der Tuberkulose nach der Stadienlehre Rankes, ein geschichtlicher beurteilender Ueberblick in der Medizin. [**On the Development of TB. according to Ranke's Doctrine : A Critical Survey**]. —*Tierärztl. Rdsch.* **44.** 485-494. [Numerous refs.]

This paper gives a general survey of the development of TB. in man, with particular reference to Ranke's doctrine of primary infection, generalization and isolated TB. of organs. There is nothing new in the article, but it does give a good account of the subject.—E. G. WHITE.

FÖLGER, A. F. (1938). Ueber einige bemerkenswerte tuberkulöse Primärkomplexe in Darmkanal von Rind und Schwein. [**Noteworthy Cases of TB. Primary Complexes in the Intestinal Canal of a Calf and Two Pigs**].—*Acta path. microbiol. scand.* Suppl. No. 37. pp. 179-191. 6 figs. [6 refs.] [In German].

In the pig, primary TB. of the mesenteric lymph nodes is not usually accompanied by macroscopic lesions in the intestine. Two cases with extensive lesions in the intestine are described. The first was due to avian tubercle bacilli, and the Peyer's patches throughout the intestine were enlarged and firm, but showed no caseation or calcification. The second case was unusual in that tuberculous ulcers

were present in the intestine, and the mesenteric lymph vessels leading to the enlarged and caseated mesenteric lymph nodes were also tuberculous. The organism could not be typed, as the material had already been fixed.

In addition, a case of primary TB. of the intestine with ulceration followed by generalization is described in a calf. The animal had sucked a cow with tuberculous mastitis, and formed part of Bang's experiments on TB. in 1918.
—E. G. WHITE.

GRÄUB, E., & ZSCHOKKE, W. (1938). Experimentelle Untersuchungen über die tuberkulose Reinfektion. [**Research on Tuberculous Reinfection**].—*Schweiz. Arch. Tierheilk.* **80.** 289-297. 2 tables, 2 charts.

A series of six g. pigs were inoculated with each of the following vaccines :– antiphymatol—a dead vaccine [(1908). *Z. Tiermed.* **12.** 81.], BCG and Friedmann's turtle bacillus, both avirulent, and a vaccine prepared from a strain causing slow progressive TB. in g. pigs. Two months later three of each series were inoculated with 0·0001 mg. of virulent TB., and three with 0·00001 mg. Controls were similarly treated. The results showed that no protection was conferred by the antiphymatol, that the avirulent vaccines merely delayed death, and that although the virulent vaccine prevented reinfection the animals finally died from the vaccine injection itself.—P. S. WATTS.

SCHMIDT, J., & MESSING, S. (1938). Lässt sich die Probe nach Triboulet zur Erkennung der Tier-Tuberkulose verwenden ? [**Diagnosis of TB. by Triboulet's Test**].—*Berl. tierärztl. Wschr.* April 8th. 197-199. [10 refs.]

Triboulet's test for TB.—demonstration in the faeces of proteins said to be breakdown products of intestinal lesions—was applied to 124 animals of various species, as follows :– 84 slaughtered for food, of which 43 showed some pathological abnormality ; 10 slaughtered in emergency ; 7 in a dying condition ; 14 normal, and 9 sick animals. Sixteen in all gave a positive reaction, of which 11 showed no evidence of TB. ; 108 gave a negative reaction, of which 21 were found to be infected with TB. The conclusion drawn is that this test is not of value for the diagnosis of TB.—P. S. WATTS.

PLUM, N. (1938). **Tuberculous Abortion in Cattle.**—*Acta path. microbiol. scand.* Suppl. No. 37. pp. 438-448. [9 refs.] [In English]. [Also appeared in *Skand. VetTidskr.* **28.** 461-470].

From the examination of the placentas of several hundred cattle which had aborted, and from field observations, P. estimates that 1 % of abortion in Denmark is tuberculous in origin. The bovine type of TB. is causing a decreasing, and the avian type an increasing proportion, a fact related to the gradual eradication of bovine TB. Experiments are described in which three tuberculosis-free pregnant cattle received cultures of avian type bacilli *per os*, and none aborted. Four pregnant cattle were injected intravenously with avian culture ; three aborted after an average period of 100 days as a result of placental infection. P.M. examination revealed infection in the uterus only.—G. B. BROOK.

MONARI, D. (1938). Patogenesi e morfologia generale della infiammazione tubercolare nei mammiferi. [**The Pathogenesis of TB. in Mammals**].—*Clin. vet., Milano.* **61.** 175-187.

M. gives a general account of the pathogenesis of TB. in the various domestic animals, with special reference to the theories of RANKE and of NIEBERLE.—J. A. N.

NIELSEN, F. W. (1938). Die Bekämpfung der Rindertuberkulose in Dänemark. [**Control of Bovine TB. in Denmark**].—*Dtsch. tierärztl. Wschr.* **46.** 513-515.

Eradication, based on Bang's system, was initiated 40 years ago in Denmark, when free tuberculin testing was made available. Dairy societies in lightly infected areas withheld from each farmer a sum of money which was returned if a herd was rendered free from TB. within five years. The government then authorized the compulsory testing of remaining herds in any area in which more than 90% of farms were free of infection, and many " free " areas were created. At the same time a fund was established to guarantee a price for reactors slaughtered in heavily or slightly infected herds in such areas, and this, with a communal isolation-rearing farm, ensured the progress of the campaign in Jutland. Statistics are submitted and information is given on the law concerning open TB. and pasteurization of dairy products.—G. B. BROOK.

I. NIEBERLE, K. (1938). Zur vergleichenden Pathologie der Tuberkulose der Tiere. Tuberkulose bei der Giraffe. [**TB. in a Giraffe**].—*Arch. wiss. prakt. Tierheilk.* **73.** 134-138. 2 figs.

II. SCHMIDT, H. W. (1938). Bildet die Tuberkulose eine ernste Gefahr für unseren Rehwildstand ? [**Does TB. Constitute a Grave Danger for Wild Deer ?**]—*Berl. tierärztl. Wschr.* Feb. 4th. 64-65. 1 fig. [Numerous refs.]

III. SCHMIDT, H. W. (1938). Anzeichen für Tuberkulose beim Reh. [**Signs of TB. in Roe Deer**].—*Berl. Münch. tierärztl. Wschr.* July 29th. 449-450. 1 fig.

I. A report of TB. in a giraffe, believed to have been about 11 years old, which died after showing respiratory symptoms for a short period. The lesions comprised pulmonary TB. with numerous bronchiectatic cavities, secondary tuberculous intestinal ulceration, and miliary TB. of the liver and spleen. Caseation and calcification were not found in the lesions, which were essentially productive in character. The organism was of the bovine type.

II. After a brief review of the recorded cases of TB. in wild deer, S. describes a case which was accompanied by a faulty development of the antlers—particularly of the burrs—in comparison with those of a normal animal of the same age and size. It is suggested that further observations might be made on a possible relationship between the presence of TB. and retarded antler development.

III. It is stressed that deer in advanced stages of TB. may show no evidence of emaciation which only occurs during the few days preceding death. It would appear that 12 cases of spontaneous TB. of wild deer have been recorded, the first being in 1914 and the last by S. in 1938 [see II, above].—E. G. WHITE.

REMETE, T. (1937). Ueber die Rolle des Geflügeltuberkulosebazillus bei der Tuberkulose der Harn- und Geschlechtsorgane des Menschen. [**Avian Type Infection in Genito-Urinary TB. in Man**].—*Z. urol. Chir.* **43.** 202-207. [Numerous refs.] [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **45.** 535].

R. examined 42 cases of renal TB. in man, testing the patients with old tuberculin and avian tuberculin and inoculating kidney tissue into fowls. Six reactions to avian tuberculin resulted, but the inoculation tests were all negative.—J. E.

I. ROCHER, H. L., & LAPORTE, R. (1938). Rôle du bacille tuberculeux bovin dans les tuberculoses externes. [**Role of Bovine Type Tubercle Bacilli in TB. in Man**].—*C. R. Soc. Biol. Paris.* **127.** 266-268. [1 ref.]

II. SAENZ, A. (1938). Rôle de l'infection bacillaire d'origine bovine dans la tuberculose de l'enfant et de l'adulte. [**Role of Bovine Type Bacilli in TB. in Children and Adults**].—*Ibid.* 269-272. [2 refs.]

III. SAENZ, A., & FATIO, D. M. (1938). Étude étiologique et bactériologique de deux cas de synovite tuberculeuse à bacille bovin. [**Two Human Cases of Tuberculous Synovitis caused by Bovine Type Tubercle Bacilli**].—*Ibid.* 1418-1421. [3 refs.]

I. The authors report the results of an enquiry into the incidence of bovine tubercle bacilli in human infections. In only two cases, both with lesions in cervical lymph nodes, out of 89 were they able to identify a bovine strain.

II. Bovine type bacilli were isolated in only 26 out of 1,199 cases of TB. of various kinds. S. concludes that the incidence of bovine type infection in France is lower than that in Great Britain and Denmark.

III. Cultivation of material from the lesions on the hands of butchers, both of whom had received cuts while handling bovine carcasses, proved the organism implicated to be a bovine type bacillus.

I. POTTER, T. S. (1937). **Survival of Oxygen and Water Deprival by Tubercle Bacilli.**—*J. infect. Dis.* **60.** 88-93. [Numerous refs.]

II. CARVALHO, A., & VIDAL, C. (1937). Le pH et la culture du bacille tuberculeux. [**The Importance of the pH of the Medium in the Cultivation of Tubercle Bacilli**].—*C. R. Soc. Biol. Paris.* **126.** 588-589.

I. Avian tubercle bacilli were subjected to the severest possible deprival of water and oxygen, with a result interesting in that it upset the usual conception of the action of desiccation on the tubercle bacillus. In the first experiments organisms survived for 14 months and two years, in the second for 12 months. Theoretically no oxygen or water could have been present in preparations submitted to the technique described.

II. Experiments are described in which tubercle bacilli were sown in liquid media and the pH determined at intervals during growth. There appeared to be no correlation between the type of organism and the initial and subsequent pH of the medium.—A. WILSON TAYLOR.

DIETER, R. (1937). Zum Vorkommen der Paratuberkulose beim Schafe. [**Johne's Disease in Sheep**].—*Z. InfektKr. Haustiere.* **52.** 70-78. 2 figs. [6 refs.]

The object of this paper is to present evidence of the occurrence of Johne's disease in sheep. Three clinical cases from a flock near Leipzig, in which losses from a disease resembling Johne's disease in cattle had been sustained, were observed for two months and examined carefully P.M. The lesions of the intestine closely resembled those of the bovine disease [see, however, *V. B.* **6.** 207.], and acid-fast bacilli were present in abundance. [No cultural tests are mentioned].—J. E.

BENDIXEN, H. C., & JEPSEN, A. (1938). Corynebact. equi (Magnusson, 1923) som Aarsag til tuberkuloselignende Suppurationsprocesser hos Svin, navnlig i Halslymfekirtler. [*Corynebact. equi* (**Magnusson, 1923**) **as the Cause of Processes Similar to TB. of the Cervical Lymph Nodes in Swine. Preliminary Report**].—*Medlemsbl. danske Dyrlaegeforen.* **21.** 401-422. 5 figs. on 3 plates, 3 tables. [7 refs.] [German summary].

Type determination of tubercle bacilli from 81 cases of swine TB. gave a majority of bovine organisms from some areas, but in other areas the avian type was predominant. Among 19 cases sent in from an abattoir in Funen there was

one case of localized TB. of the cervical lymph nodes, caused by a human type bacillus; 12 cases of localized TB. and three of generalized TB. were caused by the avian type bacillus, and three cases of generalized TB. were caused by the bovine type.

During the examination of samples from two large pig farms where TB. was suspected, and of further samples sent in by bacon factories from pigs supposed to be infected, homogenized material was grown on Löwenstein's and on Besredka's nutrient media; in 12 cases a growth was obtained of a Gram-positive organism which in its morphological, cultural and pathogenic characters corresponded to *Corynebact. equi* described by MAGNUSSON in 1923. The corynebacterium found by the authors was cultivated from the cervical lymph nodes in pigs with the tuberculous lesions usually described as "localized TB. of the cervical lymph nodes". The authors conclude that it is identical with the coccobacillus found by HOLTH and AMUNDSEN in 1936 [*V. B.* **7.** 54.]; in Denmark PLUM (1938) and JESPERSEN (1938), have independently of each other proved the frequency of lesions containing this coccobacillus (also called the "Holth-bacillus"). The homogenization technique used by the authors to a great extent destroys the corynebacteria in the original material; they obtained better results by the usual method of sowing direct from infected material into melted agar. As a rule this gives ample growth after a period of 36-48 hours.

As in the case of udder corynebacteria, the organisms here dealt with are not infrequently acid-fast in the original material, but microscopic examination showed acid-fast coccoid organisms in only about a third of the cases from which corynebacteria could be cultivated. In pus from horses and g. pigs inoculated with pure culture of *Corynebact. equi* the authors found coccoid acid-fast organisms similar to those found in the spontaneous lesions in pigs.

A series of experiments carried out by the authors showed that this corynebacterium was pathogenic for young pigs. If they are fed pure culture, lesions occur with great regularity, especially in the respiratory organs. The disease usually takes the form of subacute or chronic pneumonia, necrosis, and the formation of abscesses; nodules may occur on and in the lungs, and to the naked eye they are very like those found in TB. The bacteria regularly pass through the mucous membrane of the throat; weeks after feeding the organisms they may be cultivated from the submaxillary lymph nodes, where they live and multiply. Subcutaneous inoculation of the organism is regularly followed by the formation of abscesses in the regional lymph nodes as well as at the site of inoculation. In view of these observations, the authors suggest that *Corynebact. equi*, besides causing small lesions in the cervical lymph nodes of the pig, may also play some part in causing diseases of the respiratory organs in pigs.

CAUDRON, M. F. (1936). Le rouget du mouton. [*Erysipelothrix rhusiopathiae* **Infection in Sheep**].—*Thesis, Alfort.* pp. 108. 4 figs., 5 tables, 14 graphs. [Numerous refs.]

The chief form of the disease in sheep is polyarthritis, and it is pointed out that the name "rouget" is incorrect, as no erythema is observed in affected sheep. The history of appearance of cases in various countries is traced. The organism is stated to have lost much of its virulence for pigs after passages through sheep. A somewhat detailed description is given of the form of disease produced by *E.r.* in horses, oxen, sheep, pigs, birds, rodents and human beings.

Infection of sheep is considered by the author to be *via* the umbilicus from infected soil. Methods of immunization and prevention are discussed.—H. B.

NELSON, J. B. (1938). **Studies of an Uncomplicated Coryza of the Domestic Fowl. IX. The Co-Operative Action of Hemophilus gallinarum and the Coccobacilliform Bodies in the Coryza of Rapid Onset and Long Duration.** —*J. exp. Med.* **67.** 847-855. 2 tables. [5 refs.] [See also *V. B.* **7.** 519].

N. found that the exudate from cases of coryza of rapid onset and long duration (Type III) contained *H.g.* and coccobacilliform bodies, and that both could be demonstrated throughout the course of the disease. Infection with coccobacilliform bodies did not usually cause any reaction until 2-3 weeks later, and organisms were seldom demonstrable before the tenth day (Type II coryza). Infection with pure cultures of *H.g.* gave rise to a coryza of rapid onset and short duration (Type I coryza). The organism seldom persisted in the host for more than two weeks, and frequently died earlier. When the two agents were combined, a coryza of rapid onset and long duration resulted. The rapidly multiplying *H.g.* created a favourable environment for the development of coccobacilliform bodies, which were demonstrable from the first day, and the presence of the bodies appeared to prolong the residence in the host of *H.g.* The effect of the combination indicated that a true symbiotic reaction had taken place.—J. E. WILSON.

I. JACOTOT, H. (1938). Sur la prophylaxie sérique de la pasteurellose des boeufs et des buffles. [**Serum Prophylaxis of Pasteurella Infection in Cattle and Buffaloes**].—*Bull. Acad. vét. Fr.* **11.** 246-249. [2 refs.]

II. JACOTOT, H. (1938). Accidents chez les boeufs employés à la préparation du sérum contre la pasteurellose bovo-bubaline. [**Deaths in Cattle Used for the Production of Serum against Bovine Pasteurellosis**].—*Ibid.* 250-254. [1 ref.]

III. DELPY, L., & RASTEGAR, R. (1938). Sur un nouveau vaccin contre la septicémie hémorrhagique des bovidés et le barbone des buffles (pasteurelloses). [**A New Vaccine against Pasteurellosis in Cattle and Buffaloes**]. —*Rev. Immunol.* **4.** 322-339. 13 tables. [Part of the work was also reported in *Bull. Acad. vét. Fr.* **11.** 256-258].

I. It is stated that an effective serum for the preventive and curative treatment of the less acute forms of haemorrhagic septicaemia of bovines can easily be produced by hyperimmunization of cattle, and such a serum has for many years been in use in Indochina.

A number of controlled experiments were performed on calves and rabbits to ascertain the efficiency of antiserum against artificial infection; 10 c.c. and 20 c.c. doses protected calves against subsequent inoculation of virulent culture which killed all controls in less than 36 hours. Inoculation of serum at the same time as virulent culture prevented fatal results if given in doses of 20 c.c., and sometimes in doses as low as 4 c.c. Inoculation of 30 c.c. of serum six hours after infection and 25 c.c. 12 hours after infection caused recovery. Rabbits inoculated with 0·5 c.c. serum at the same time as virulent culture were protected, and only one out of three rabbits succumbed after being inoculated, six hours after infection, with 1·5 c.c. intravenously and 5 c.c. subcutaneously.

II. Of 95 cattle employed over a period of 12 years for the manufacture of H.S. antiserum, seven which had long been receiving periodical inoculations of pasteurella succumbed after a routine inoculation. Some of these died rapidly from an acute attack, others after showing symptoms for several days. In the latter case the pasteurella recovered were found to be of low virulence, or even avirulent. An endotoxin is believed to have been responsible for the mortality resulting from such infections of low virulence.

III. With the intention of investigating various methods of vaccination against bovine pasteurellosis, one strain of pasteurella from cattle and two from buffaloes were isolated and examined. All were highly pathogenic, and bacteriologically there was little difference between them. Antigens composed of formolized and heat-killed bacteria gave little or no protection against subsequent inoculation with virulent culture, in a selected test dose of some 300,000 organisms, which killed controls in 24-36 hours. Experiments with natural aggressin were also unsuccessful. Attenuated organisms were prepared :– (1) by prolonged growth in the incubator and at room temperature, and (2) by growth in filtered oedema obtained from local lesions in calves experimentally killed by pasteurella. The attenuation was not marked, and although a safe dosage produced some immunity it did not protect against five times the selected lethal test dose. Pasteurella incorporated with olive oil, or 30% lanoline plus olive oil, were tested on a number of calves. In a dose equal to one M.L.D. of the pure culture no reaction followed, but neither was there any immunity to five times the test dose, and vaccination with a quantity equal to four test doses caused death in 2-4 days. It was also found that pasteurella in oil or lanoline died in less than 48 hours. Mixed with 5% saponin (Poulenc brand), more than one lethal test dose proved fatal, though one dose produced immunity if inoculated into the caudal fold. If pasteurella were added to 5% saponin, lysis occurred and in 24 hours the fluid became progressively clear and was sterile. Calves inoculated with 2 c.c. of this fluid containing 500 times the lysed organisms in a test dose proved immune to 50 times the usual test dose. A moderate reaction followed the inoculation of this vaccine. A filtrate of the fluid also immunized, but to a lesser extent, and this is probably due to some absorption by the filter candle.—S. J. Gilbert.

Kairies, A., & Tartler, G. (1937). Die Brauchbarkeit der Kochblutagarplatte zum Nachweis von Pasteurellen bei Hasen und Kaninchen. Mit einem Beitrag über allgemeine und obligate Hämoglobinophilie bakterieller Influenzaerreger. [**The Use of the Blood Agar Plate in the Demonstration of Pasteurellosis in Hares and Rabbits, with a Note on Haemoglobinophilic Influenza Bacteria**].—*Zlb. Bakt. I.* (*Orig.*). **140.** 36-47. 2 figs. [Num. refs.]

The authors examined smears from the throat and pharynx of shot wild hares and rabbits, and found it very easy, in the majority of cases, to cultivate pasteurella-like organisms which closely resembled *Haemophilus influenzae* from human beings. They state that when ferrets are artificially infected with human strains of the influenza virus, they are prone to develop symptoms of specific animal influenza that may actually be due to pre-existing infection with such a haemophilic organism.

Organisms cultivated from rabbits had affinities with the human influenza bacillus and the *Pasteurella* of ferrets [*V. B.* **8.** 269]. These rabbit organisms agglutinated *Past. leptiseptica.* The authors state that the property of requiring the special growth constituents necessary for the members of the haemophilic group is not of value as a means of differentiating between the *Haemophilus* and *Pasteurella* groups. They confirm Seifried's opinion [*V. B.* **7.** 309.] that most of the pulmonary affections of rabbits are brought about by pasteurella-influenza forms.—M. F. Benjamin.

di Aichelburg, U. (1937). Sul potere batteriostatico in vitro di alcune sostanze coloranti per i germi del gruppo salmonella. [**Bactericidal Action of some Dyes on Salmonella**].—*G. Batt. Immun.* **19.** 321-336. 3 tables. [Numerous refs.] [English, French and German summaries].

Of 15 dyes, belonging to the groups triphenylmethane, thiazine, acridin, and azo-compounds, tested by the author, only malachite green, brilliant green, methyl green, pyronin, and trypaflavine had any bactericidal action *in vitro* on 15 different strains of salmonella, including *S. paratyphi* A, B, and C, *S. enteritidis* Gärtner, *S. typhi-murium*, and *S. suipestifer*, and the actions shown were slight; the addition of serum to the liquid medium increased the bactericidal effect of trypaflavine, but either decreased or else did not affect that of the remaining dyes. All the strains tested were more sensitive in the R than in the S stage of dissociation. The differences noted in the reaction of the various strains to the dyes are not regarded as characteristic of these types.

MEISSNER, H. (1938). Zur pathologischen Anatomie und Histologie des Schweineparatyphus. [**Pathology and Histology of Swine Paratyphoid**].—*Z. InfektKr. Haustiere.* **53.** 180-200. 7 figs.

Between September, 1935, and October, 1937, *Salmonella cholerae-suis* was isolated 12 times from pigs at the Berlin abattoir. The pathological and histological changes corresponded to those of typhoid and paratyphoid infection in man and to those of bovine paratyphoid. Miliary necrosis occurred in the liver and spleen; endophlebitis was found in internal organs. This infection in pigs is clearly defined. The typical miliary necrosis is easily overlooked and it is therefore desirable that the veterinarian should use a hand lens during meat inspection.

—JAC. JANSEN (UTRECHT).

SANTAGOSTINO, C. (1937). Il paratifo acuto setticemico dei suini. [**Acute Paratyphoid Septicaemia in Swine**].—*Clin. vet., Milano.* **60.** 77-88. [13 refs.]

Acute septicaemia caused by a highly virulent strain of *Salmonella cholerae-suis* was observed in a stock of about 350 swine. In three weeks, 60 adult animals died, and the mortality of the younger animals reached 80%, death occurring after 3-4 days. Badly prepared food was believed to have caused an initial digestive disturbance, which may have paved the way for the paratyphoid infection. Neutralizing the acidity of the skim milk fed to the pigs, and treatment of the healthy animals with a specific vaccine, yielded good results.

—HANS GRAF (ZÜRICH).

ROEMMELE, O. (1938). Paratyphus-B-Schottmüllerinfektion verursacht seuchenhaftes Verlammen. [**Infectious Abortion of Sheep caused by *Salmonella paratyphi* B**].—*Z. Fleisch- u. Milchhyg.* **48.** 403-405.

A ewe on the point of aborting, from a farm on which abortion had been occurring, was slaughtered and examined bacteriologically, and *S. paratyphi* B was cultivated from visceral organs. From the blood of a living sheep that had just aborted, *S. paratyphi* B was also isolated, and agglutinins were demonstrated in its serum. A second investigation on the farm four weeks later gave negative results; the serum titres had decreased and the infection was considered to have died out. It became known later that, a few months before the sheep aborted, the children on a neighbouring farm had been ill with *S. paratyphi* B infection. It is suggested that the infection came from this source, the bad winter fodder predisposing the animals to the disease, which abated after they were put out to pasture.—JAC. JANSEN (UTRECHT).

I. MACCOLINI, R. (1938). Sur l'immunité conférée par des injections de bacilles paratyphiques morts ou vivants, incorporés dans la lanoline. [**Immunity Conferred by Injections of Dead or Living Paratyphoid Bacilli**

Embedded in Lanoline].—*Rev. Immunol.* **4.** 340-358. 3 figs., 5 tables. [3 refs.]

II. NÉLIS, P. (1938). La production des agglutinines spécifiques chez les lapins injectés au moyen de bacilles paratyphiques enrobés dans un mélange vaseline-lanoline. [**Immunization against Paratyphoid in Rabbits by Means of Vaseline-Lanoline Antigens**].—*C. R. Soc. Biol. Paris.* **127.** 487-488. [3 refs.]

I. Six groups of four rabbits each were vaccinated with four increasing doses of heat-killed *Salmonella typhi-murium* at weekly intervals, as follows :– groups 1, 3, 5 and 6 with saline suspensions, injected subcutaneously, intraperitoneally and intravenously, and groups 2 and 4 with suspensions in a lanoline plus olive oil mixture (subcut. and intraperit.). Three further groups of four rabbits each were vaccinated with three doses of live bacilli at intervals of 15 days for two groups, and of seven days for the last group, as follows :– group 8 with saline suspension (subcut.), and groups 7 and 9 with small and large doses of suspension in lanoline plus olive oil mixture (subcut.). Results of precipitation and agglutination tests with the sera of the nine groups against somatic and flagellar antigens of *S.t.-m.* are tabulated, and three graphs illustrate the rate of production of precipitins and somatic and flagellar agglutinins in the first six groups. The resistance of each group to infection with graded doses of virulent bacilli, was virtually the same.

II. The vaccination of four groups of four rabbits each against *S. paratyphi* B placed the vaccines in the following order of decreasing efficiency :– live emulsion in vaseline-lanoline (subcut.) ; heat-killed saline emulsion, diluted 1 in 10, subdurally ; heat-killed emulsion in vaseline-lanoline (subcut.), and heat-killed emulsion (subcut.). The first of the above vaccines induced immunity without infection, while the second caused a meningeal reaction.—R. O. MUIR.

TOBA, A. (1937). **Chemical and Immunological Study of Bacterial Constituents. (II).**—*J. Jap. Soc. vet. Sci.* **16.** 358-383 of pt. 1. 1 table, 1 graph, 1 chart. [Numerous refs.] [In Japanese : abst. from English summary pp. 44-48 of pt. 2].

T. studied the composition of *Salmonella typhi-murium* from a purely chemical standpoint. He reports the isolation of various alcohol-soluble and alcohol-insoluble fractions, but no indication of the antigenic construction of these components is given.—R. E. GLOVER.

THOMSEN, A. (1938). **Contributions to Elucidation of the Question about the Frequency of Infectious Abortion in Cattle and its Combating in Denmark. (Fejo 1936—Bornholm 1937).**—*Acta-path. microbiol. scand.* Suppl. No. 37. pp. 533-543. 1 table. [7 refs.] [In English].

Clinical experience indicates that some 10 per cent. of the cattle in Denmark are infected with contagious abortion. Very little is known of the extent of infection as shown by blood testing, but control by testing was commenced on the island of Fejo in 1936 and on Bornholm about a year later. On Fejo, only 11 herds were found infected out of 100 herds comprising 1,087 cattle. In the positive herds, 52 % of the cattle were reactors. Routine testing and isolation were practised, and at the end of 12 months 98 % of the herds were free of infection. 3,705 herds, comprising 37,897 cattle, were tested on Bornholm, and 1,227 herds, containing 5,537 reactors, were found to be infected. Control measures were put into operation, but considerable difficulty was experienced in inducing sufficient farmers to co-operate. After 15 months of testing on this island, 38 herds were cleared of infection.—S. J. GILBERT.

WACKERBARTH, G. (1937). Ist bei Bruzellose-kranken Kühen der nichtträchtige Uterus Sitz der Erreger? [**Is the Non-Pregnant Uterus of Cows with Brucellosis the Seat of Infection?**].—*Inaug. Diss., Hanover.* pp. 33. [16 refs.]

Three hundred animals were examined serologically and the percentage of infection in three different areas varied from 14·7 to 25·6. Twenty-two uteri from non-pregnant cows with a titre of over 500 were examined. No macroscopical evidence of infection was found in 17 cases; pyometra was found in two, and glandular enlargements in three. In nine cases, histological findings were abnormal, and these are detailed together with the methods of staining. Neither culturally nor by animal inoculation could *Br. abortus* be demonstrated in any instance. —P. S. WATTS.

LOBEL, L. W. M., VAN DER SCHAAF, A., & ROZA, M. (1938). Smetstofdragers van Brucella abortus bij runderen in het district Grati van het regentschap Pasoeroean. [**Carriers of *Br.a.* in Cattle in the Grati District of the Pasoeroean Department, Java**].—*Ned.-ind. Bl. Diergeneesk.* **50.** 188-199. [11 refs.] [English summary].

Of 2,078 head of cattle examined serologically in Grati for *Br.a.* infection, 12 were positive, and four of these 12 were killed and cultures made from them. G. pigs were inoculated with tissue suspensions, and in three out of the four cases *Br.a.* was isolated; in two cases, cultures were grown from cutaneous worm nodules. It is suggested, therefore, that the examination of worm nodules (*Onchocerca gibsoni*) of suspected animals is important.—JAC. JANSEN (UTRECHT).

DELBÉ, P. (1935). La brucellose des équidés. Etude clinique et expérimentale. [**Brucella Infection in Horses**].—*Thesis, Alfort.* pp. 95. 1 graph. [Numerous refs.]

A study of brucellosis in equines in which numerous clinical observations are interpolated. Attempts to reproduce the clinical disease experimentally were unsuccessful, and local abscess formation is believed to have been due to pre-existing lesions of *Onchocerca* in many cases. Reactions to the agglutination test were found to vary in titre in the case of various strains from equine and bovine sources, and several tests should be made of blood of a suspected animal before it is declared negative. Ophthalmic and intradermal reactions were found to give accurate results in infected animals. One case of brucellosis in a donkey is described.—S. J. GILBERT.

VERŠILOVA, P., PAVLOV, P., & NESGOVOROV, B. (1937). Epidemiologija brucelleza na Južnom Urale. [**Epidemiology of Brucellosis in the South Urals**].—*Brucellosis in Sheep.* pp. 423-434. 6 tables. Moscow: Viem Publ. Dept.

A Commission of specialists were delegated in 1932 to investigate the epidemiology of human brucellosis in the South Urals region of the U.S.S.R. It is stated that they established a direct relationship between the spread of brucella infection among the sheep, goats, cattle, and pigs on the farms and the incidence among the personnel coming into direct contact with the animals. Infection was especially rife (46·4%) among the milkers and shepherds, both men and women, but only amounted to 15·7% among the hands in general charge of small units of cows. From 7·6% to 18·6% infection was found among the workers in meat-preserving or meat-curing factories, indicating that it may be spread by the carcasses of infected animals. In general, in the region examined, brucella infection is definitely an occupational disease; both sexes seemed equally susceptible, irrespec-

tive of age, except that persons under 15 and over 50 were rarely employed in these occupations. A high percentage of the infected persons were acutely affected.

The agglutination reaction was on the whole quite reliable for diagnosing human brucellosis ; the melitin test was superior, however, in that it gave positive reactions in 13% of the cases which had either reacted negatively to the aggl. test or given negative blood cultures. Since the melitin test has not yet been sufficiently studied, it is recommended that both methods should be used concurrently for diagnostic purposes.

SOLOVJEV, A. (1937). Materialy k histopatologii eksperimentaljnogo brucelleza ovec. **[The Histopathological Changes in Experimental Brucellosis in Sheep]**.—*Brucellosis in Sheep*. pp. 117-128. 9 figs. [15 refs.] Moscow : Viem Publ. Dept.

Four rams and 20 ewes received subcutaneous injections of from 5×10^5 to 4×10^9 organisms of the M2 strain (non-virulent) of *Br. melitensis* and also from 10^9 to 5×10^9 of the M5 (virulent) strain , two other ewes were infected by two peroral doses 2×10^{10} and 4×10^{10} of the M5 strain, and seven ewes were immunized either with a "vaccine" or by injections of the non-virulent M2 strain; following this, some were infected with 10^9 organisms of the virulent M5 strain. The animals were killed at intervals of 2-30 weeks after infection and histological examinations of the organs were made. T. describes the histological changes he observed in the liver, spleen, kidneys, adrenal glands, lungs, heart, bone-marrow, uterus, udder, and certain lymph nodes.

In the lymph nodes there was hyperplasia of the reticulo-endothelium with the formation in certain cases of small clumps of reticulo-endothelial and of giant cells, reduction of the lymphoid elements, and numerous plasma cells in the medulla. In the liver there was hyperplasia of Kupfer's cells, formation of intra-acinous foci, and infiltration of lymphoid elements into the periportal tissues. In the spleen there was hyperaemia of the pulp, with deposition of haemosiderin in a number of cases and, in isolated cases, the formation of small foci of reticular hyperplasia. In the adrenal glands there was wide-spread necrosis of the cells in the reticular zone of the cortex. The other changes observed, in particular the formation of suppurating foci in the adrenal glands, in the liver and in the mammary gland, were so few in number that it was not possible to relate them to brucella infection.

It is pointed out that, while this investigation throws some light on the histological changes caused by brucellosis in sheep, the number of animals observed was limited. Moreover, no observations were made on the changes brought about by infection in certain other systems, *e.g.* the nervous system, which clinical observations show definitely to be affected by the disease.

I. DUBOIS, C. (1938). Innocuité, chez la brebis, la chèvre et la vache, du vaccin préparé avec des germes vivants avirulents, de *Brucella abortus suis*, en émulsion dans un excipient irrésorbable. **[Harmlessness for Sheep, Goats and Cattle of a Vaccine of Living Avirulent *Br. suis* in an Unabsorbable Excipient]**.—*Bull. Acad. vét. Fr.* **11.** 42-51. [8 refs.] [Also appeared in *Arch. internat. Brucelloses.* **1.** 90-99].

II. DUBOIS, C. (1938). II. Le vaccin en excipient irrésorbable préparé avec des germes vivants, avirulents, de *Brucella abortus suis*, paraît susceptible de préserver de la brucellose, la brebis, la chèvre et la vache, indemnes de cette maladie. **[Immunizing Value for Ewes, Goats and Cows of Live, Avirulent *Br. suis* in a Non-Absorbable Excipient]**.—*Ibid.* 219-233. 1 table. [8 refs.]

I. D. first recounts his experiments with a vaccine of living avirulent *Br.s.* combined with lycopodium powder in a vaseline or lanoline base. During the years 1936-1938 inclusive, some 20,000 animals (7,600 cows, 12,800 sheep and 200 goats) widely distributed throughout France were vaccinated, all but a few hundred being healthy animals in a contaminated environment. The chief object of the work was to premunize susceptible animals and to prevent abortion among those already infected. This article details the experiments designed to test any adverse results of the treatment for both purposes.

More than half the inoculated animals were pregnant, some being within two or three weeks of term ; others were tested with 5-6 times the usual dose ; in no case was parturition abnormal.

The same strain of *Br.s.* was also used for a saline suspended vaccine on more than 100,000 animals without any case of undulant fever being noted in the attendants, although numerous cases had been recorded previously. No spread of infection to non-premunized animals from long contact with premunized healthy animals was noted.

Sheep, cattle and g. pigs were tested by haemoculture after this vaccination, with negative results. Agglutination reactions of g. pigs injected with blood and urine from these animals remained negative. The milk of two vaccinated ewes and one cow also remained free of vaccinal organisms, as revealed by g. pig tests.

II. D. details numerous field vaccination experiments with ewes, goats and cows in various regions of France. All the herds used were clinically free, or were first proved to be free, of brucella infection by serum or allergic tests, or both, and following vaccination some of them were placed under conditions which would normally have induced a proportion of brucellosis among them.

The vaccine used had previously been proved avirulent, even when inoculated during gestation, and it remains localized at the site of inoculation. Bacteraemia and elimination of bacteria through either the urine or the milk do not occur ; it is claimed, therefore, that the vaccine is safe for contact animals and attendants. For ewes and goats a dose of 0·25-1 mg. and for cows 1-5 mg. of living *Br.s.* in a mixture of 90·5 parts vaseline, 9 parts lanoline, and 0·5 parts lycopodium powder was used in these trials. The local, serological and allergic reactions to the vaccine are all detailed. The practical duration of the immunity conferred appeared to be one year, and could not be assessed by the local nodular reaction, which did not vary. D. considers that cattle should be re-vaccinated as soon as the reaction to the allergic test diminishes.

All the vaccinated animals produced normal young at term, and no abortion occurred among them. A more extended field trial is proposed.—C. V. Watkins.

I. Violle, H. (1938). De la prophylaxie des brucelloses. [**Prophylaxis of Brucellosis**].—*Arch. internat. Brucelloses.* **1.** 20-26. [English, German and Italian summaries].

II. Stockmayer, H. W. (1938). Die Immunisierung im Dienste der Bekämpfung der Rinderbrucellose. [**The Use of Immunization in the Control of Bovine Brucellosis**].—*Ibid.* 82-89. [In German : English, French and Italian summaries].

III. Dubois, C. (1938). III. Traitement de la brucellose animale par les germes vivants, avirulents, de *Brucella abortus suis*, en émulsion dans un excipient irrésorbable. (Résultats observés au cour de ces trois dernières années chez 17·692 ovins, 1·438 caprins et 4·287 bovins). [**Treatment of Animal Brucellosis with Living, Avirulent** *Br. suis* **Emulsified in an Unabsorbable Excipient**].—*Bull. Acad. vét. Fr.* **11.** 383-404. 6 tables. [6 refs.]

IV. KRESS, F. (1938). Ergebnisse der Untersuchungen über die praktische Verwendbarkeit einer Formolvakzine gegen das seuchenartige Verwerfen der Rinder. [**Results of the Use of a Formol-Vaccine against Bovine Brucellosis**].—*Z. InfektKr. Haustiere.* **52.** 316-327. 3 tables.

I. A general paper dealing with the conventional measures.

II. The results of the vaccination of cattle against brucella infection by both living and dead vaccines are discussed mainly as a résumé of the literature. The conclusion drawn is that there is, at the moment, no satisfactory vaccine.

III. The results obtained by the use of the vaccine previously described by D. [see above] are given. A total of 23,000 cattle, sheep and goats were vaccinated, and it is stated that after vaccination the number of abortions and cases of sterility were markedly reduced. It was found that one injection conferred immunity and that this could be given without danger during gestation. No case of human infection could be traced to the use of the vaccine.

IV. K. gives the following details of his vaccine :– a mixture of ten strains of *Br.a* is grown in liquid media for 2-4 weeks ; 0·2% formalin is then added and the flasks are reincubated for 24 hours. After sterility tests the vaccine is issued, the dose being 10 c.c. followed in four weeks by 20 c.c. and 12 weeks later by a further 20 c.c. After the third injection the blood titre reaches 1 : 100 and then falls steadily till it becomes negative at the 12th week.

In the vast majority of cases no ill effects followed the injections, but occasionally the milk yield was affected or slight fever was observed. Double doses could be used where a fresh and virulent outbreak was encountered. In 1,633 cattle in herds newly infected with *Br.a.* and in which there was a loss of 19·3% of calves, this loss was reduced to 0·9% after vaccination. In herds in which the infection was of long standing, containing 762 animals, a 15·9% calf loss was reduced to 0·6%.—P. S. WATTS.

IZAR, G., & FAMULARI, S. (1936). Differenziazione dei tipi nel gruppo brucella mediante cultura su terreni addizionati di acido lattico. [**Differentiation of Brucella by Lactic Acid Media**].—*Rif. med.* **52.** 1015-1016. 1 table. [Also appeared in *Klin. Wschr.* **15.** 1560-1561]. [Abst. from abst. in *Boll. Sez. ital. Soc. int. Microbiol.* **8.** 209-210.]

The authors state that types of brucella can be differentiated by cultivation on media containing lactic acid in proportions of 10%, 1·25% and 0·625% respectively. *Br. suis* develops in the presence of all three concentrations, *Br. abortus bovis* does not develop in any, and the human strain only develops in the presence of 1·25% and 0·625% of lactic acid. The authors used only three human, four bovine and two porcine strains in their experiments.

POPOV, I. (1937). Epidemiologičeskoe obsledovanie na brucellez podopytnogo ovčevodčeskogo khozjaïstva ekspedicii. [**An Epidemiological Study of Brucellosis in Man on the Expedition's Sheep-Farm**].—*Brucellosis in Sheep.* pp. 435-443. 10 tables. Moscow : Viem Publ. Dept. [See also *V. B.* **9.** 73].

Serological and allergic tests showed that 19·5% (123 out of 631 men and women tested) of the total personnel on the Experimental Sheep Farm of the Expedition were infected with brucellosis. The highest incidence of the disease occurred among the veterinary personnel (77·7%), the shepherds (52·8%), and the animal attendants (50%), demonstrating the high professional risk of direct contact with infected stocks. The fact that the allergic tests were somewhat more sensitive than the agglutination test in the diagnosis of brucellosis in man was adduced.

O'Callaghan, W. P. (1937). **Undulant Fever in Ireland.**—*Irish. J. med. Sci.* July. pp. 285-302. 4 figs. [Numerous refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* **12.** 881. Signed A. Joe].

In the Irish Free State the first case of undulant fever was described in 1930. Since then 21 cases have been reported from the author's laboratory, including 9 in 1936. The latter number is the highest in any one year and is ascribed to more frequent reference to laboratory methods in the elucidation of obscure febrile conditions. Three of the cases were confirmed by blood culture and all showed Brucella agglutinins at levels ranging from 1-250 to 1-10,000, the majority being above 1-1,000. It is stated that 20 cases have been described in Northern Ireland between 1932 and 1936, and it is probable that another 20 or 30 cases are known in the experience of other laboratories. The clinical details of cases are similar to the form of the disease seen in Britain, the Continent, and the U.S.A. Of the author's 21 cases, 18 were males aged between 25-50, and 7 occurred among land or cattle workers. Among some thousands of Wassermann sera tested, Brucella agglutinins have been found in measurable amounts in 20 per cent., thus suggesting past or present experience of the infection.

Ehrismann, O. (1937). Ueber anaerobes Bakterienwachstum in synthetischen Nährlösungen. [**Anaerobic Bacterial Growth in Synthetic Culture Media**]. —*Zlb. Bakt. I.* (*Orig.*). **140.** 273-280. 1 fig. [Numerous refs.]

E. developed work on *Corynebacterium diphtheriae* to include the growth of this organism on synthetic media under anaerobic conditions. He then elaborated the media to support the growth of the strict anaerobes *Clostridium tetani*, *Cl. welchii*, *Cl. botulinum*, *Cl. chauvoei*, *Cl. septique*, and *Cl. putrificum*, and found that these could be cultivated if many amino-acids were combined and ascorbic acid added. His final medium was :– NaCl, 2 g. ; KH_2PO_4, 1·7 g. ; Na_2HPO_4, 0·7 g. ; $MgCl_2$, 0·2 g. ; $CaCl_2$, 0·2 g. ; NH_4Cl, 3 g. ; Na_2S, 0·5 g. ; glucose, 5 g. ; sodium asparaginate, 5 g. ; sodium glutaminate, 5 g. ; arginine carbonate, 0·1 g. ; cystin, 0·02 g. ; histidine, 0·05 g. ; leucine, 0·12 g. ; tryptophane, 0·02 g. ; tyrosine, 0·04 g. ; valine, 0·15 g. ; ascorbic acid, 1·0 g., and distilled water, 1,000 g. : the pH was 7·6 (adjusted with NaOH).—P. S. Watts.

Ozzano, T., & Re, C. (1937). L'influenza della onde corte hertziane sui germi patogeni. [**Influence of Short Waves on Pathogenic Bacteria**].—*G. Batt. Immun.* **18.** 535-547. [Numerous refs.] [English, French and German summaries].

No significant changes were observed in the growth and other properties of cultures of pathogenic bacteria, including *Escherichia coli*, *Staphylococcus aureus*, and *Salmonella paratyphi* A, either after a single irradiation for 30 minutes with radio short waves (7·36 m. and 4·30 m.) or after repeated 30-minute irradiations at intervals of 1-5 hours. The effects of the treatment varied from stimulation to depression, but were always compensated by the recuperative powers of the organisms. It is believed that the effects noted were solely due to the temperature factor.

Mackinnon, J. E. (1936). Epizootia de tiña en caballos y contaminación del hombre. [**Ringworm in Horses and its Transmission to Man**].—*Arch. urug. Med.* **8.** 498-502. [6 refs.]

M. reports cases of ringworm in five horses and the transmission of infection to a man. Microscopic examination revealed the presence of an endo-ectothrix megaspore organism which was cultivated on Sabouraud's gelatin medium

with 8% pure bee honey and on Sabouraud's gelatin with 4% Chanut's crude maltose, at a temperature of 30°C. The cultures were downy in appearance, at first white and then cinnamon coloured. On the tenth day they were typical of *Trichophyton equinum*.

The groom who had charge of one of the animals had a lesion on his forearm which had responded to treatment with local applications of iodine. F. was unable to make a microscopic examination, but the diagnosis of the doctor in charge had led to the examination of the horses.

A description of the various agents of ringworm, especially in horses, is given. It has been stated that ringworm in man in Brazil is nearly always due to infection from animals and not from human beings.

SHAHAN, M. S. (1937). **A Dermatomycosis of Guinea-Pigs.**—*Arch. Derm., Chicago.* **36.** 335-341. 4 figs.

S. investigated small cutaneous lesions, occurring chiefly on the head and face, in a stock of breeding g. pigs. The affected areas were scaly, depilated and faintly reddened, but there appeared to be no pruritus; recovery was spontaneous. No mites were revealed by microscopic examination.

Cultures from lesions yielded felt-like colonies of a fungus, at first (microscopically) resembling *Microsporon felineum*, but later tentatively identified as *Achorion gypseum* Bodin.

Most in-contact g. pigs became affected, but none in neighbouring cages; the condition was easily reproduced in other g. pigs and also in rabbits, rats, mice, cats and a dog, by rubbing lesion material on to the skin.

BLUMENTHAL, F. L., & SNOW, J. S. (1936). **A Rapid Cultural Method for the Diagnosis of Tinea Infections.**—*J. Amer. med. Ass.* **107.** 1367-1369. 4 figs., 1 table. [6 refs.]

Direct microscopic examination of 48 cases of ringworm revealed filaments in 33%; cultures on Sabouraud agar gave positive results in 64% of the same cases, while hanging drop cultures from hairs or scales gave 72% of positive results within less than two days.

DISEASES CAUSED BY PROTOZOAN PARASITES

PASINATI, P. (1937). Un interessante caso di miosite interstiziale fibrosa con sarcosporidi in una bovina. [**Sarcosporidial Interstitial Myositis in a Bovine**].—*Clin. vet., Milano.* **60.** 97-99. 4 figs. on 2 plates.

The muscles of a cow were found to have been invaded by large growths of interstitial connective tissue with partial hyaline degeneration of the muscle fibres; numerous areas of inflammation were found, with sarcosporidia in different stages of development.—HANS GRAF (ZÜRICH).

BONNIN, F. (1937). La résistance des protozoaires et des protozooses aux médicaments. [**The Resistance of Protozoa and Protozoan Diseases to Drugs**].—*Festschrift Bernhard Nocht, 1937.* pp. 49-52. Hamburg: Friederichsen, de Gruyter & Co. [In French].

Abnormal resistance of protozoa to drugs may be due either to an inherent quality of the strain, to the acquisition of resistance during treatment, or to the interference by the host system with the action of the drug. It is pointed out that ineffective treatment of syphilis may create drug-resistant strains of the spiro-

chaete in the same way that drug-resistant strains of trypanosomes are produced. It is suggested that this danger may be largely avoided by the use of the maximum tolerated dose of the drug, or by the use of two drugs which supplement each other's action when given at the same time.—U. F. RICHARDSON.

SCHWETZ, J. (1938). Quelques réflexions et suggestions pour une future classification des trypanosomes pathogènes de l'Afrique centrale. [**Some Reflections and Suggestions for the Classification of Pathogenic Trypanosomes of Central Africa**].—*Ann. Parasit. hum. comp.* **16.** 265-272. [10 refs.]

In discussing the classification of African trypanosomes, S. suggests that it is unreasonable to deny specific identity to *Tryp. dimorphon*, a long slender organism, and to *Tryp. montgomeryi*, a broad type, which differs morphologically from *Tryp. congolense* in length and breadth, whilst accepting *Tryp. simiae* which, according to the description of BRUCE, only differs from *Tryp. congolense* in being slightly larger.

He points out that, with the recognition of the fact that a free flagellum may occur in the pig trypanosome belonging to the *Tryp. congolense* group, this group can no longer be described as monomorphic in that respect.

He divides the trypanosomes into three groups distinguished by the position of the blepharoplast :– 1. *Tryp. congolense* group, characterized by the lateral position of the blepharoplast, with the species *Tryp. congolense*, *Tryp. dimorphon*, *Tryp. montgomeryi*, and *Tryp. suis* [= *Tryp. simiae*]. 2. *Tryp. vivax* group, characterized by the terminal or sub-terminal position of the blepharoplast, and including the species *Tryp. vivax*, a large form with sub-terminal blepharoplast, *Tryp. cazalboui*, a smaller form with terminal blepharoplast, and *Tryp. uniforme*, a still smaller form. He suggests that *Tryp. caprae* may be a synonym of *Tryp. cazalboui*. 3. *Tryp. brucei* group, in which the blepharoplast may be terminal or lateral, and including the species *Tryp. brucei*, *Tryp. pecaudi*, *Tryp. gambiense* and *Tryp. rhodesiense*.

[Although on general grounds this classification has much to recommend it, yet the position of the blepharoplast varies from individual to individual and with the stage of maturity. It is not such a definite characteristic as the presence or absence of a free flagellum, which can only lead to error in the case of *Tryp. simiae*, an atypical member of the *Tryp. congolense* group].—U. F. RICHARDSON.

REICHENOW, E. (1937). Die bisherigen Erfahrungen mit der Dauerzüchtung afrikanischer pathogener Trypanosomen. [**Experiences in the Longevity of Cultures of African Pathogenic Trypanosomes**].—*Festschrift Bernhard Nocht, 1937*. pp. 487-496. [5 refs.] Hamburg : Freiderichsen, de Gruyter & Co. [In German].

The records of the cultivation of *Tryp. gambiense*, *Tryp. brucei* and *Tryp. congolense* in citrated human or ape blood to which Ringer solution is added, are briefly given. *Tryp. gambiense* has been cultivated through 48 generations, and *Tryp. congolense* to 86 generations. The cause of failure of sub-culture is discussed, and it is pointed out that some human blood has an inhibitory action, whilst in other cases too low an incubator temperature was responsible for death. The best growth appears to occur at between 25° and 26°C.

R. points out, however, that trypanosomes in culture are similar to the developmental stages of the organisms in the intestine of *Glossina*. Culture is difficult in old strains of *Tryp. gambiense*, and sub-cultures often fail, and it is suggested that this phenomenon is related to the loss of transmissibility by tsetse fly which also occurs in old laboratory strains. In the case of *Tryp. congolense*, it was found

possible to obtain cultures of all strains, but in first cultures multiplication only occurred in a small proportion of the tubes. R. was unable to produce infection of vertebrates with organisms from culture, but BRUTSAERT and HENRARD [*V. B.* **8.** 568.] claim to have infected two goats by the inoculation with cultures of *Tryp. congolense*. R. suggests that accidental infection may have occurred, and points out that metacyclic trypanosomes do not appear in cultures. It has also proved impossible to cultivate *Tryp. vivax*, and it is suggested that this is because this species only develops in the proboscis of the fly, and that intestinal development does not occur. Experience has also confirmed that cultures do not succeed in the case of *Tryp. equinum* and *Tryp. equiperdum*, which have no development cycle in a vector host. Attempts to use cultured organisms for immunization have given negative results.—U. F. RICHARDSON.

ZEISS, H. (1937). Die Bekämpfung der Kameltrypanosomiase in Russland. [**Control of Camel Trypanosomiasis in Russia**].—*Festschrift Bernhard Nocht, 1937*. pp. 674-682. 5 figs. on 1 plate. [Numerous refs.] Hamburg : Friederichsen, de Gruyter & Co. [In German].

Z., who worked on the problem of camel trypanosomiasis in Russia for nine years, is of the opinion that the trypanosome concerned is very similar to, and probably identical with, *Tryp. evansi*. He was unable to detect any species of animal, except the camel, which might act as a reservoir host. Although other authors had reported that horses might carry the infection, he was unable to confirm this in his area—the Volga and Urals. He considers that transmission is through the agency of biting flies (*Tabanus*, *Chrysops* and *Haematopota*). He considers that the disease can be controlled by the treatment of affected camels, and obtained good results with naganol used intravenously in doses of 4-10 g., and on a small scale with naganol combined with antimosan or stibosan. He was unable to confirm that tryparsamide was of value in treatment.—U. F. RICHARDSON.

GRANOUILLIT, F., & DO-VAN-VIEN. (1938). Observations sur le surra naturel des bovo-bubalins, du chien et du cheval en Cochinchine. [**Natural Surra in Cattle, Buffaloes, Dogs and Horses in Cochinchina**].—*Rev. Méd. vét., Toulouse*. **90.** 402-411. [12 refs.]

This article records serious disease in cattle and buffaloes affected with surra, associated with fluke infestation. It is suggested that the fluke infestation of the liver prevents the attainment of the leucocytic equilibrium required to combat the trypanosome infection. Other diseases such as rinderpest or haemorrhagic septicaemia may also break down the resistance of the animal to a trypanosome infection which had previously been controlled.

In one area, naganol treatment of infected horses and dogs was not successful, and it is suggested that the passage of the trypanosome through horses may enhance its virulence for dogs, cattle and buffaloes, and also reduce its susceptibility to treatment with naganol.

Disease in horses is recorded in which no trypanosomes could be detected till just before death, which occurred suddenly with an extraordinary rapid destruction of red blood corpuscles. It is suggested that the animals had been infected for four months previous to the detection of trypanosomes. [No description is given of the trypanosome concerned, and possibly an organism other than *Tryp. evansi* was involved].—U. F. RICHARDSON.

CARDONA, L. (1937). Sulla refrattarieta' verso il Trypanosoma evansi di alcuni uccelli domestici ad alimentazione normale e a regime avitaminico. [**Resist-**

ance to *Tryp. evansi* of Fowls on Good or Avitaminotic Diets].—*Nuova Vet.* **15.** 103-106.

The object of these experiments was first, to test the alleged immunity of birds to *Tryp. evansi*, and secondly to find whether this immunity was affected by keeping the birds on an avitaminotic diet. C. used two hens, two pigeons, and two turtle-doves, inoculating them with blood taken from an infected g. pig. The birds remained in good health, and repeated tests failed to detect a single trypanosome in the blood stream. An attempt to infect healthy g. pigs from the blood of the experimental birds also failed. He then put all the birds on an avitaminotic diet, but even when the birds sickened from the diet he was unable to infect them with trypanosomes, and found no trace of the parasites in any of the birds on P.M. examination.—S. F. J. HODGMAN.

LAUNOY, L. (1938). Distinction entre la chimio-résistance naturelle présentée par *Trypanosoma congolense* et la chimio-résistance acquise par *Trypanosoma annamense*. [**Distinction between the Natural Drug-Resistance of *Tryp. congolense* and the Acquired Drug-Resistance of *Tryp. annamense***]. —*Bull. Soc. Path. exot.* **31.** 618-621. 1 table. [1 ref.]

Whilst drug-resistant strains of *Tryp. evansi* and strains of *Tryp. congolense* were found equally resistant to antimony in the form of aminophenylstibinate of methylglucamine, a naturally resistant *Tryp. congolense* was found to be much less susceptible to acriflavine, germanin and tryparsamide than the drug-resistant strain of *Tryp. evansi*, which had been rendered drug-resistant artificially.—U. F. R.

MARTIGNOLLES. (1938). Notes sur les trypanosomiases animales dans la région de Ouagadougou. (Relations avec la trypanosomiase humaine). [**Animal Trypanosomiasis in the Ouagadougou District**].—*Bull. Serv. zootech. Epiz. A.O.F.* **1.** No. 3. 10-12.

A survey of bovine trypanosomiasis in Ouagadougou, French West Africa, revealed an approximate correlation with human infection. It is stated that the disease in cattle has spread to the north, and that certain areas have been rendered uninhabitable for cattle of the zebu type or for horses. The species of trypanosome encountered in cattle is *Tryp. vivax*, and infection can be cured by intramuscular injection of tartar emetic in oil, or by tryparsamide. The only tsetse present in the area are *Glossina tachinoides* and *G. palpalis*, and the Harris trap is recommended as a method of destruction.—U. F. RICHARDSON.

BROWN, H. C., & BROOM, J. C. (1938). **Studies in Trypanosomiasis. II. Observations on the Red Cell Adhesion Test.**—*Trans. R. Soc. trop. Med. Hyg.* **32.** 209-222. 2 figs., 8 tables. [16 refs.] [See also *V. B.* **8.** 212].

As irregular results were obtained with the red cell adhesion test in the study of the serology of *Tryp. brucei* strains in rats, an investigation was undertaken regarding the influence of varying concentrations of trypanosomes and red corpuscles on adhesion. The extent of adhesion was found to depend largely on the concentration of red cells, and to some extent on the concentration of trypanosomes; the greater the concentration of red corpuscles, the greater was the degree of adhesion. It was also found that the degree of adhesion varied with the time of inoculation, and a standard was adopted of incubating for five minutes at 37°C. equal volumes of immune serum, a 1 : 5 dilution of fresh g. pig serum, and washed suspensions of human red cells and trypanosomes standardized to 500,000 per c.mm. and 5,000 per c.mm. respectively.

It was confirmed that the red corpuscles of laboratory animals will not adhere to the sensitized trypanosomes, and that the red blood corpuscles of certain human

beings may have little or no adhesive properties. It was also found that, whilst some bacteria exhibited adhesion, other strains of the same species did not. Experiments failed to explain this variation in corpuscles or in bacteria.

It was found that homologous serum caused the agglomeration and lysis of the trypanosomes in the absence of suitable adhesive particles.—U. F. RICHARDSON.

KUJUMGIEFF, I. (1937). Sul comportamento sperimentale dei volatili verso il Trypanosoma equiperdum. [**Experimental** *Tryp. equiperdum* **Infection in Fowls and Pigeons**].—*G. Batt. Immun.* **19.** 383-386. [5 refs.] [English, French, and German summaries].

Attempts to infect fowls and pigeons by subcutaneous or intravenous injections of *Tryp. equiperdum* gave negative results.

WAGNER, O., & HEES, E. (1937). 156 positive Trichomonasblutbefunde bei Mensch und Tier. [**Trichomonas Blood Tests in Man and Animals**].—*Zlb. Bakt. I.* (*Orig.*). **138.** 273-290. 7 figs., 4 tables. [11 refs.]

The observations were mostly on the parasites of human beings. Little is said concerning the species that occur in animals. It is recorded that trichomonads were also observed in the blood of 25 bulls, 56 cows, 11 mares, one pig, one dog and three cats. The organism was also isolated from the genital tract of some of the bovines and from the intestine of the total of ten cats examined. The parasitic nature of trichomonads is discussed.—J. E.

OEHLKERS, H. (1937). Ueber den gelben Knopf und die sonstigen Trichomonadenerkrankungen der Tauben. [**" Yellow Button " and Trichomoniasis in Pigeons**].—*Inaug. Diss., Hanover.* pp. 55. 1 table. [13 refs.]

O. gives a detailed account of his studies on the occurrence, symptoms, aetiology, and control of *Trichomonas columbae* infection in pigeons in Germany. Of 828 adult pigeons, 56·6% carried the organism in their oesophageal mucosa; from this situation it can be transmitted to the young in feeding. The most dangerous and common form of the disease, the " yellow button " lesion [*V. B.* **8.** 697.], only attacks young birds (10- to 25-day-old), and is frequently confined to the progeny of given parents. In such cases the progeny of valuable, infected parents, may be saved by hatching their eggs under a healthy pair.

SIMITCH, T. (1938). Sur une amibe buccale du chien *Entamoeba canibuccalis* n. sp. [**A New Amoeba in the Mouth of Dogs** *E.c. n. sp.*]—*Ann. Parasit. hum. comp.* **16.** 251-253. 1 fig. [1 ref.]

S. found that three out of 165 dogs examined at Skoplje carried an amoeba in their saliva which was differentiated from *E. gingivalis* in man. In one dog the organism was alone, in another it was associated with *Trichomonas canistomae.* A description is given of its morphology and cultural characteristics. Experiments showed that it could not infect man, whilst *E.g.* could not infect dogs under normal conditions. Inoculation into the intestine of young dogs gave negative results.

BRUMPT, E. (1938). Le *Plasmodium bubalis* Sheather 1919, du buffle domestique d'Asie, peut-il évoluer chez les anophèles ? [**The Possible Development of** *Pl.b.* **of the Buffalo in** *Anopheles*].—*Ann. Parasit. hum. comp.* **16.** 369-373. 1 fig. [13 refs.] [See also *V. B.* **9.** 155].

B. again draws attention to the importance of ascertaining the prevalence of *Pl.b.* infection in view of the possibility that the oocyst forms in *Anopheles* may be mistaken for those of human plasmodia.—U. F. RICHARDSON.

HEGNER, R., & ESKRIDGE, Lydia. (1938). **Susceptibility of Young Red Cells to the Merozoites of Avian Plasmodia.**—*Amer. J. Hyg.* **27.** 471-492. 1 plate, 3 tables. [Numerous refs.]

The literature is reviewed and the differences between young and old R.B.C. are described in detail. It was found that in hen canaries artificially infected with *Pl. cathemerium*, although the peripheral blood only contained 1-6% of young R.B.C., trophozoites were present in 88·5% of them compared with 16·5% in old cells. Many of the young cells contained several merozoites.

By injecting phenylhydrazine hydrochloride the percentage of young R.B.C. could be raised to over 90, and heavier infections were found in these birds. It is suggested that as the disease progresses the young R.B.C. are rendered more resistant to infection.—J. E. WILSON.

NEITZ, W. O. (1937). **Eperythrozoonosis in Sheep.**—*Onderstepoort J. vet. Sci.* **9.** 9-30. 5 tables. [18 refs.]

Eperythrozoonosis of sheep is an infectious disease caused by *Eperythrozoon ovis*, a small supra- and intercellular blood parasite having a ring, rod, irregular or oval shape, and belonging to the family Anaplasmidae. The disease is characterized by an irregular pyrexia, a variable degree of icterus, and anaemia. Relapses may occur at varying intervals after recovery. The mode of transmission is unknown, but it would appear that the vector is a blood-sucking insect. The disease has been found in merino and Black Head Persian sheep, and is probably wide-spread in South Africa. When stained by Giemsa's method the parasites are pale mauve to pinkish mauve, and resemble delicate rings, about 0·5-1μ in diameter. In addition to rings are found triangles with rounded angles, ovoid, comma, rod, dumbbell and tennis racket forms. The parasites usually appear 5-7 days after infection, and are present in their greatest numbers 5-10 days after their first appearance. They are seen in the blood for about 14 days on the average, but may be present for as long as 42 days. The course of the disease does not differ in splenectomized sheep. Only one death has been recorded.

The immunity in this disease is a premunition. The arsenostibio preparation Std 386 B was found to be a specific for treatment, the effective dose being 5 mg. per kg. body weight.—E. M. ROBINSON.

ALLEN, Ena A. (1937). *Tyzzeria perniciosa* **gen. et sp. nov., a Coccidium from the Small Intestine of the Pekin Duck,** *Anas domesticus* **L.**—*Arch. Protistenk.* **87.** 262-267. 12 figs. on 2 plates. [6 refs.] [In English].

A. describes the life-cycle and pathogenicity of a new coccidium of the duck, which has been named *Tyzzeria perniciosa*. A key to the genera of the sub-family Cryptosporidiinae is given; the sporulated oocyst of *T.p.* (measuring 9-10μ by 10-13μ) resembles those of *Pfeifferinella* and *Schellakia*, having eight sporozoites (measuring 10μ by 3·5μ) lying directly within the oocyst wall. Complete oocysts were observed in the faeces on the sixth day after infection of experimental ducks. Young ducks died within a few days of the appearance of symptoms, and autopsy revealed severe intestinal inflammation and haemorrhage, and white spots on the exterior of the intestinal wall, which was thickened; the lumen was sometimes filled with a cheesy exudate, which was not in the form of a core as in *Eimeria tenella* infections. A. stresses the depth to which the parasites had penetrated, microscopic examination revealing them even in the muscle layers.

The genera *Pfeifferinella* and *Tyzzeria* are compared, *Tyzzeria* differing from the former in that it has three types of schizont in the life-cycle.

PIGOURY, L. (1937). Piroplasmes et piroplasmoses en Syrie et au Liban. [**Piroplasmosis and Piroplasms in Syria and Lebanon**].—*Bull. Soc. Path. exot.* **30.** 767-772.

An account of animal piroplasms observed up to the present time in the Levant. P. believes that indigenous animals acquire natural infection and immunity early in life : therefore the appearance of acute piroplasmosis is not common.

He has only found *Babesia caballi* in horses (and once in an ass), but *B. equi* is also believed to occur. Equines are liable to pass through attacks of fever in the spring, but they recover spontaneously. The tick vector is believed to be *Hyalomma savignyi.*

Only one piroplasm has been seen in cattle, and it is similar to *Babesiella berbera* of North Africa. The disease due to this organism occurs here and there throughout the year, and is manifested by fever, jaundice, anaemia and haemoglobinuria. The vector seems to be one or other species of *Hyalomma* (*H. savignyi*, *H. dromedarii*, *H. mauritanicum* or *H. aegyptium*). *Boophilus annulatus calcaratus* was found once on an affected bovine.

In 1937, piroplasmosis was diagnosed in sheep and goats in these regions for the first time, being similar as to causation and symptoms to the disease in cattle. *Anaplasma marginale*, *Theileria recondita* and *Erythrocytozoon ovis* have also been found in affected sheep ; only lambs and kids are affected. The tick vectors are *Rhipicephalus sanguineus* and *Rh. bursa.*

Canine piroplasmosis [*B. canis* evidently meant] has often been observed, and *Rh.s.* is presumably the vector.—J. E.

CURASSON, G. (1938). Notes sur la piroplasmose aviaire en A.O.F. [**Avian Piroplasmosis in French West Africa**].—*Bull. Serv. zootech. Epiz. A.O.F.* **1.** No. 2. 33-35.

C. notes the frequency of the occurrence of avian piroplasmosis in French West Africa. He discusses the pathogenicity of *Aegyptianella pullorum* for various domestic and wild birds, giving a brief historical review of the work done on the nature of the parasite. The curative value of several drugs is compared. Two intramuscular injections of gonacrine gave the best results.—F. H. MANLEY.

DISEASES CAUSED BY VIRUSES

CRAWFORD, M. (1938). **Immunity Following a Natural Attack of Foot-and-Mouth Disease.**—*Vet. Rec.* **50.** 801-802.

Experience with F. & M. disease at the Government Dairy, Colombo, Ceylon, showed that naturally induced immunity in cattle lasts for at least two years. The records of the dairy show that in every outbreak of F. & M. disease a large proportion of the herd escape infection due to previously acquired immunity, and that in nearly every instance the animals which become infected are among those introduced since the previous outbreak.—D. D. OGILVIE.

FRENKEL, H. S., & VAN WAVEREN, G. M. (1938). Immunisatieproeven verricht met gekweekt mond- en klauwzeer virus. [**Immunization Trials with Cultivated Foot and Mouth Disease Virus**].—*Tijdschr. Diergeneesk.* **65.** 264-281. [English, French and German summaries].

Virus from a field case of F. & M. disease was found to be type O (Vallée), and was pathogenic for g. pigs. It was grown in cattle embryo tissue cultures, and a tissue culture diluted 1 : 10,000 was pathogenic for g. pigs, causing generalization 48 hours after injection into the tongue.

In experiments on cattle with simultaneous injection of culture virus and serum, no difference was noticed in the effect when the serum was injected 18 hours before the tissue culture, or at the same time. An attempt was made to combine serum-virus injection and treatment of the feet with disinfectants. Dressing the feet with a 10% solution of tincture of iodine and washing the teats with a 0·5% NaOH solution were said to be helpful.

The serum-virus method was uneconomical owing to the large quantity of serum required. In further experiments, therefore, virus alone was used combined with the above prophylactic disinfection measures. The technique was to clean the feet and dress them with a 10% iodine solution, and apply a culture diluted 1 : 5,000 to the tongue. Teat infection occurred in some of the test animals and it was ascribed to contaminated straw. This treatment produced a more severe generalization in young animals than did the simultaneous method, but the animals usually recovered without complications.—JAC. JANSEN (UTRECHT).

I. PILOTTE. (1938). Notes au sujet du traitement de la fièvre aphteuse. [**Treatment of Foot and Mouth Disease**].—*Echo vét., Gembl.* **67.** 71-76.

II. PIEROT. (1938). Valeur prophylactique et thérapeutique du lait virulent dans la fièvre aphteuse. [**Preventive and Curative Value of Virulent Milk (Subcutaneously Injected) in F. & M. Disease**].—*Rev. Path. comp.* **38.** 226-227.

III. PIEROT. (1938). De l'influence de l'alimentation sur l'évolution de la fièvre aphteuse. [**Influence of Diet on the Course of F. & M. Disease**].—*Ibid.* 811-813.

I. Owing to the severity of the wide-spread outbreak of F. & M. disease in Belgium, the current methods of controlling the disease have been ineffectual. The injection of in-contact susceptible cattle with immune serum from recovered animals has proved reasonably effective, however, since 10% were completely protected, while in the remaining 90% the disease occurred in a very mild form.

II. Milk obtained from cattle at the height of an attack of F. & M. disease and injected into susceptible cattle induced a benign attack of the disease followed by immunity.

III. In recent outbreaks the most severe cases of F. & M. disease occurred in fat cattle, especially those which were receiving a supplement of cake in their diet.—R. E. GLOVER.

RUBINO, M. C. (1936). Le fiebre aftosa. Medios para combatirla de que se dispone actualmente. [**Foot and Mouth Disease Control**].—*Bol. mens. Direcc. Ganad., Montevideo.* **20.** 161-174.

A speech to a lay audience. The methods of control followed in different countries are discussed and also those which can be used in Uruguay ; eradication was not advocated.

HOLZ, K. (1938). Beiträge zur sogenannten Bornaschen Krankheit (Kopfkrankheit) und der ansteckenden Blutarmut des Pferdes. [**Borna Disease and Equine Infectious Anaemia**].—*Z. InfektKr. Haustiere.* **53.** 161-174.

The symptomatology of Borna disease and that of E.I.A. are very similar, and differential diagnosis may be difficult. Encephalitis may occur in the course of E.I.A. and is probably related to the presence of a granular ependymitis. A peculiar haemorrhagic form of Borna disease occurs in Württemberg in addition

to the classic form. Granular ependymitis is primarily a productive inflammatory process in which there occurs a periarteritis with marked fibroblast proliferation. Borna disease is characterized by acute inflammatory lesions with perivascular infiltration of lymphoid cells, mainly around small veins.—E. G. WHITE.

I. SABIN, A. B., & OLITSKY, P. K. (1938). **Variations in Pathways by which Equine Encephalomyelitic Viruses Invade the CNS of Mice and Guinea-Pigs.**—*Proc. Soc. exp. Biol., N.Y.* **38.** 595-597. [5 refs.]

II. SABIN, A. B., & OLITSKY, P. K. (1938). **Age of Host and Capacity of Equine Encephalomyelitic Viruses to Invade the CNS.**—*Ibid.* 597-599. [5 refs.]

III. JABOTINSKI, J. (1938). Les altérations histopathologiques du système nerveux des lapins dans l'infection expérimentale avec le virus de " l'encéphalo-myélite équine." [**Histopathology of Equine Encephalomyelitis in Rabbits**].—*Ann. Inst. Pasteur.* **60.** 451-464. 7 text figs., 32 figs. on 6 plates.

I. Eastern equine encephalomyelitis virus, injected into the leg muscles of mice 15-21 days old, invaded the C.N.S. along the peripheral nerves in only 5% of cases, whilst in the others it reached the C.N.S. by the olfactory pathway, *i.e.*, *via* the blood and olfactory mucosa. With Western virus the path varied ; among 15-day-old mice, 80-90% exhibited signs of olfactory invasion, and in 10-20% spread was by the peripheral nerves. In 21-day-old mice the position was reversed.

II. Natural resistance studies demonstrated that as mice and g. pigs grow older, certain changes occur in the tissues, which may then act on localized barriers to the invasion of, or passage of virus in, the C.N.S. [see also I, above].

III. On the basis of his studies with a neurotropic virus which is responsible for a clinical condition in France with lesions resembling Borna disease and equine encephalomyelitis in America, J. concludes that the term " encephalomyelitis " as used in connexion with this disease is a misnomer, as it is not in keeping with the symptoms or histological changes. The lesion is primarily a progressive degenerative condition of the nerve cells, the changes in the connective tissue being insignificant. The absence of any inflammatory change is one of its chief features.

A complete description is given of the various histological changes together with illustrations. The investigation was carried out with rabbits artificially infected with tissue from an infected horse.—GWILYM O. DAVIES.

RECORDS, E., & VAWTER, L. R. (1938). **Production of Antiserum for Equine Encephalomyelitis.**—*J. Bact.* **36.** 295.

Attempts at hyperimmunization even by repeated subcutaneous inoculation of equine encephalomyelitis virus often yield unsatisfactory results. The authors found that intravenous injection of a single large dose of virus gave a tenfold rise in antiviral titre within ten days. No fatalities or severe reactions were encountered. Titration of virus-neutralizing power of hyperimmune sera was tested on g. pigs and chicken embryos. The latter are considered the more dependable and economical, and the procedure is also more rapid.—J. A. GRIFFITHS.

I. REMLINGER, P., & BAILLY, J. (1938). Non élimination du virus d'Aujeszky par la muqueuse gastro-duodénale. Caractère différential avec la rage. [**Differentiation of Aujeszky's Disease Virus from Rabies by Failure of the Former to Infect the Gastro-Duodenal Mucosa**].—*C. R. Soc. Biol. Paris.* **127.** 965-966.

II. REMLINGER, P., & BAILLY, J. (1938). La glycémie et le rapport chloré érythro-plasmatique dans la maladie d'Aujeszky. [**The Chlorine and Sugar Content of the Blood in Aujeszky's Disease**].—*Ibid.* **128.** 178-180. 2 tables.

III. Goret, P., & Mariette, C. (1938). Réceptivité du furet (*Putorius furo* L.) au virus de la maladie d'Aujeszky inoculé par différentes voies. [**Susceptibility of the Ferret to the Virus of Aujeszky's Disease**].—*Ibid.* 871-873.

IV. Remlinger, P., & Bailly, J. (1938). Action de la bile sur le virus de la maladie d'Aujeszky. [**Effect of Bile on the Virus of Aujeszky's Disease**].—*Maroc méd.* **18.** 350.

I. Rabbits, guinea pigs, dogs and cats were inoculated by different routes with the virus of Aujeszky's disease, and specimens of gastric and duodenal secretions, taken after death, were transmitted to susceptible animals. In contradistinction to the results obtained with rabies virus, these secretions were invariably non-infective.

II. A biochemical examination of blood from rabbits and dogs suffering from Aujeszky's disease showed a marked increase both in the sugar and chloride contents of the blood. The elevation in the latter was almost entirely due to an enrichment of chloride in the cellular elements.

III. Ferrets inoculated with the virus of Aujeszky's disease by the intraocular and intramuscular routes succumbed within four days after exhibiting well-marked pruritus. Animals inoculated intracerebrally also died within four days.

IV. Rabbit brain containing the virus of Aujeszky's disease was rapidly inactivated by ox, sheep, pig, dog or rabbit bile. The absence of virus was determined by the injection of the mixtures into the anterior chamber of the eye of experimental animals.—R. E. Glover.

I. Jacotot, H. (1937). Quelques cas remarquables de prolongation de la période d'incubation chez des cobayes inoculés de rage des rues après vaccination. [**Prolonged Incubation Period in Guinea Pigs Inoculated with Street Rabies Virus after Vaccination**].—*C. R. Soc. Biol. Paris.* **126.** 849-851.

II. Jacotot, H., Colson, M., & le Roux, G. (1938). Contribution à l'étude expérimentale de la vaccination antirabique. [**Experiments on Antirabic Vaccination**].—*Ann. Inst. Pasteur.* **61.** 92-103.

III. Cruveilhier, L., Lepine, P., & Viala, C. (1938). Pouvoir rabicide du sérum sanguin de lapins vaccinés contre la rage comparativement par la méthode des moelles desséchées et au moyen du vaccin phéniqué. [**Comparison of the Rabicidal Power of the Blood Serum of Rabbits Vaccinated against Rabies by Dried and Phenolized Virus Respectively**].—*Ibid.* 187-192. 1 table. [2 refs.]

IV. Dodero, J. (1938). Taux de souillure des moelles et des cerveaux rabiques. [**Extent of Bacterial Contamination of the Brain and Spinal Cord in Rabies**].—*Bull. Soc. Path. exot.* **31.** 562-564. 2 tables. [1 ref.]

I. Four g. pigs vaccinated against rabies and then tested with a street virus, succumbed after long periods (16-30 weeks). In each instance rabies virus was recovered from the brain.

II. G. pigs vaccinated with rabies virus inactivated with (a) ether plus phenol, (b) phenol, and (c) formalin respectively, showed some resistance to an intramuscular injection of street virus. The most satisfactory results were obtained with formolized virus, especially when two doses were given with an interval of three weeks ; moreover, formolized virus conserved its antigenic value for much longer periods than the other vaccines.

It is pointed out that, as far as dogs are concerned, it is not always practicable to give two injections of vaccine, but the experiments suggest that a single injection of a double dose of vaccine would probably provide adequate protection.

III. Rabbits were inoculated with multiple doses of cerebral tissue containing rabies virus inactivated by (a) desiccation, and (b) 1% formol for 24 hours at 20°-22°C. Graded amounts of their sera were added to fixed doses of the virus and the mixtures inoculated intracerebrally into g. pigs. In almost every case neutralizing antibodies were detectable, the amounts of serum required to neutralize an equal amount of a 1 : 100 dilution of virus (titre not given) varying from 0·25 c.c. up to 2 c.c. The conclusion was reached that the phenolized suspension was as active as dried brain in stimulating antibody formation.

IV. Bacterial contaminations varying from 11% to 18% were found in the spinal cords of rabbits inoculated with rabies virus and killed in the last stages of the disease. Less than 4% of the brains from the same animals were infected. The majority of the organisms isolated were inhabitants of the normal rabbit intestine.

—R. E. Glover.

Leach, C. N. (1938). **Comparative Methods of Diagnosis of Rabies in Animals.** —*Amer. J. publ. Hlth.* **28.** 162-166.

The results of intracerebral inoculation of mice for the diagnosis of rabies are described.

A small portion of Ammon's horn is ground up with nine parts of hormone broth and centrifuged ; 0·03 c.c. of the supernatant fluid is then injected into the brain of a mouse 4-6 weeks old. Of 1,032 specimens diagnosed by microscopic examination, 690 brains were reported negative for Negri bodies, but on mouse inoculation 83 of these (12%) were positive.

The use of the mouse inoculation test shortens the time required for biological diagnosis and is inexpensive. Reactions are very consistent, and the method is claimed to be a reliable means of verifying microscopic diagnosis : it is also cheaper and more rapid than the biological test in rabbits.—D. D. Ogilvie.

Pawan, J. L. (1938). **An Unusual Strain of Rabies Virus in a Vampire Bat.**— *Ann. trop. Med. Parasit.* **32.** 35-38. [7 refs.]

A bat (*Desmodus*) caught in Trinidad was allowed to bite a rabbit, which died, after showing paralytic symptoms, within four days. Subsequently, the strain invariably killed rabbits after intracerebral and subcutaneous inoculations within 48 hours, without the presence of Negri bodies. After intrasciatic injection, however, the period of incubation was 13-20 days, and numerous Negri bodies were found in the cerebral tissues. The significance of exalted virulence in rabies virus is discussed.—R. E. Glover.

Ishii, S., Watanabe, S., & Ozaki, M. (1936). **Haemacytological Changes in Hog Cholera. II. Observations on White Cells and Blood-Platelets.**— *J. Jap. Soc. vet. Sci.* **15.** 1-8 of pt. 2. 14 tables. [6 refs.] [In English : Japanese summary pp. 1-3 of pt. 1]. [See also *V. B.* **6.** 417].

The authors first of all obtained normal values for total leucocyte counts, differential leucocyte counts, and blood platelets in eight healthy pigs aged 8-10 months. The following results were obtained :– in total leucocyte counts, the average was 16,400 per c.mm., with ranges from 10,400 to 22,500 per c.mm., and the average number of blood platelets was 29,400 per c.mm. [The range of platelet values is not given].

The same swine as had been used for the determination of normal values were then inoculated with swine fever virus. A leucopenia resulted which became worse until the period of crisis. This leucopenia was mainly due to a diminution of neutrophile leucocytes. The blood platelets also showed a similar fall.

The inoculation of an attenuated virus caused a slight leucocytosis and a slight increase in platelets. On the other hand, a weakly attenuated virus caused a picture similar to that of the natural virus.

The authors consider that the leucopenia, thrombocytopenia and relative lymphocytosis may be considered of diagnostic value in early cases of the disease.
—D. L. HUGHES.

DE KOCK, G., DU TOIT, R., & NEITZ, W. O. **Observations on Blue-Tongue in Cattle and Sheep.**—*Onderstepoort J. vet. Sci.* **8.** 129-180. 1 table, 3 appendixes. [5 refs.]

Experiments are described in which it was possible to recover bluetongue virus from cattle exposed on the veld at Tzaneen in the Northern Transvaal during the months of February and March in 1934 and 1935. Artificially infected cattle showed no reactions, but could remain carriers for a period of 22 days. In fully susceptible sheep severe reactions and mortality resulted, whereas sheep immune to the Onderstepoort vaccine strain showed febrile reactions only. Sheep remained carriers of the virus up to 60 days after injection. The most important lesions in sheep as well as their pathogenesis are discussed. The virus preserved in an aqueous solution of glycerin, carbolic acid and potassium oxalate was still virulent after a period of 8½ months. A passage of 15 generations through bluetongue-vaccinated sheep and nine generations through bluetongue-susceptible sheep failed to attenuate the virus.

RUBINO, M. C., & ESPANTOSO, M. (1938). El ectima contagioso de los ovinos. [**Contagious Ecthyma of Sheep**].—*Bol. mens. Direcc. Ganad. Montevideo.* **22.** 5-10. 3 figs. [See also *V. B.* **9.** 88].

By experiments with filtrate passed through Chamberland L2 and L3 candles, the authors were able to reproduce the disease in sheep. This condition was noted in Argentina in 1932. *Fusiformis necrophorus* was frequently found as a secondary invader in the natural lesions.—A. H. HUNTER.

I. GORET, P., & LELANDAIS, E. (1938). De l'utilisation des caillots de sang issu d'animaux hyperimmunisés. Emploi d'un extrait de caillot dans la maladie de Carré. [**Dog Distemper. The Value of Extracts of Coagulated Blood from Hyperimmune Animals**].—*Bull. Acad. vét. Fr.* **11.** 211-216. [9 refs.]

II. DARRASPEN, E., FLORIO, R., & MEYMANDI, M. (1938). Des hépatonéphrites aiguës dans la maladie de Carré. [**Inflammation of the Liver and Kidneys in Dog Distemper**].—*Rev. Méd. vét., Toulouse.* **90.** 241-269. [Num. refs.]

I. In order to secure the maximum yield of antibodies from immune serum, the clot obtained from the blood of dogs hyperimmunized against dog distemper was treated with a NaCl solution for 24 hours and the liquid removed by centrifugation. Titration experiments showed that this fraction, in doses of 1 c.c., protected ferrets against not less than 1,000 M.L.D. of virus.

The authors treated 23 dogs showing early symptoms of distemper, with doses of 20 c.c. (10 c.c. subcutaneously, and 10 c.c. intramuscularly): 16 made a complete recovery. In many instances there was a rapid amelioration of symptoms.

II. The authors give a general review of the secondary complications of canine distemper, with particular reference to the symptoms, diagnosis and treatment of toxic jaundice and acute nephritis.—R. E. GLOVER.

BELMONDO, C. (1936). Dell'influenza del cavallo nell' Eritrea. [**Equine Influenza in Eritrea**].—*Clin. vet., Milano.* **59.** 196-199.

An outbreak of influenza [? pink eye] amongst horses and mules began with marked rise of temperature, followed by loss of appetite and marked general debility. Complete recovery followed in 10-12 days.

While attending these animals B. contracted influenza, as he did when attending an outbreak on a previous occasion. He suggests that equine influenza is transmissible to human beings.—S. F. J. HODGMAN.

KREMBS, J. (1938). Histopathologie der Ferkelgrippe. [**Histopathology of Piglet Influenza**].—*Arch wiss. prakt. Tierheilk.* **73.** 387-398. 9 figs. [16 refs.]

The disease described is said to be distinct from, but similar to, the swine influenza described in the U.S.A. and Germany. It affects piglets less than four weeks old. It is a very serious disease, and during the year 1933-1934 is said to have accounted for a loss of 140-145 million Reichmarks. Although the mortality is only 4-10%, animals which recover develop badly.

The most characteristic lesions occur in the lungs as a peribronchitis leading to a catarrhal or purulent broncho-pneumonia, with associated areas of local emphysema, and collapse. In addition, there occurs a diffuse catarrhal enteritis, with acute lymphadenitis of the bronchial and mesenteric lymph nodes, non-purulent lymphocytic encephalitis and meningitis and hyperplasia of the splenic lymphoid tissue.

It would appear that the virus enters the respiratory tract, spreads throughout the lung, and then travels by the lymph vessels to the lymph nodes, and finally reaches the blood, which conveys it to the other organs. Although the lesions cannot be regarded as pathognomonic they are usually sufficiently characteristic for differential diagnosis.—E. G. WHITE.

I. SCHERP, H. W., FLOSDORF, E. W., & SHAW, Dorothy R. (1938). **Survival of the Influenzal Virus Under Various Conditions.**—*J. Immunol.* **34.** 447-454. 3 tables. [8 refs.]

II. TRILLAT, A., & BEAUVILLAIN, A. (1937). Essai de transmission aérienne de la grippe au furet par voie pulmonaire ou oculaire. [**Attempt at Aerial Transmission of Influenza to the Ferret by the Pulmonary and Ocular Routes**].—*C. R. Acad. Sci., Paris.* **205.** 1186-1188. [5 refs.]

I. For the preservation of influenza virus infective mouse lung material was found to be unsuitable, since the virus died out in relatively short periods. Much better results were obtained with tissue-culture virus. The authors favour the method of drying by the lyophile process [see p. 348.], in the presence of gum acacia. The latter is essential in order to counteract the excessive alkalinity which is liable to develop owing to the loss of CO_2 during drying.

II. Dried ferret virus was made into a very fine suspension which was discharged into the air contained in an enclosed box. In one experiment ferrets were allowed to inspire the contaminated air, while in another the virus was allowed to come into contact with their ocular membranes only. In each instance the animals presented typical symptoms of influenza, and those which were allowed to recover developed immune bodies in their blood sera.—R. E. GLOVER.

CRAIGIE, J., & WISHART, F. O. (1934). **The Agglutinogens of a Strain of Vaccinia Elementary Bodies.**—*Brit. J. exp. Path.* **15.** 390-398. 5 tables. [6 refs.]

The authors obtained antivaccine serum from rabbits by cutaneous or intravenous vaccination with vaccinia elementary bodies [E.B.]. On studying this

antiserum they found that it contained two distinct antibodies, one of which was absorbed by heated E.B. and the other only by unheated E.B. This they attribute to the presence of two agglutinogens in E.B. suspension : one was heat-labile at about 56°C., and is named L, while the other was not labile below 95°C., and is named S. This is illustrated by agglutinin absorption tests carried out by the authors.—J. E.

PARKER, R. F., & RIVERS, T. M. (1935). **Immunological and Chemical Investigations of Vaccine Virus. I. Preparation of Elementary Bodies of Vaccinia.** —*J. exp. Med.* **62.** 65-72. 1 fig. on plate. [11 refs.]

HUGHES, T. P., PARKER, R. F., & RIVERS, T. M. (1935). **Immunological and Chemical Investigations of Vaccine Virus. II. Chemical Analysis of Elementary Bodies of Vaccinia.**—*Ibid.* 349-352. 1 table. [9 refs.]

PARKER, R. F., & RIVERS, T. M. (1936). **Immunological and Chemical Investigations of Vaccine Virus. III. Response of Rabbits to Inactive Elementary Bodies of Vaccinia and to Virus-Free Extracts of Vaccine Virus. IV. Statistical Studies of Elementary Bodies in Relation to Infection and Agglutination.**—*Ibid.* **63.** 69-94, and **64.** 439-452. 3 figs., 12 tables. [Numerous refs.]

PARKER, R. F., & SMYTHE, C. V. (1937). **Immunological and Chemical Investigations of Vaccine Virus. V. Metabolic Studies of Elementary Bodies of Vaccinia.**—*Ibid.* **65.** 109-120. 5 tables. [15 refs.]

PARKER, R. F., & RIVERS, T. M. (1937). **Immunological and Chemical Investigations of Vaccine Virus. VI. Isolation of a Heat-Stable, Serologically Active Substance from Tissues Infected with Vaccine Virus.**—*Ibid.* 243-249. [14 refs.]

I. Rabbits were inoculated intravenously with three doses of washed E.B., prepared by the differential centrifugation of scrapings from the dermal lesions of vaccinia in an angle centrifuge. The sera developed agglutinins to E.B. specifically to titres of from 1 : 128 to 1 : 512. The supernatant fluid from the centrifuged material contained a soluble substance which was precipitated by the same sera in dilutions of from 1 : 32 to 1 : 64.

II. Suspensions of E.B., frozen and dried *in vacuo*, were subjected to the standard tests for proteins, fats, sugars, etc. The results showed that about 80% of the bodies were protein in nature, fat formed 6·5-10%, while the carbohydrate content varied from 4% to less than 1%. Subsequent experiments showed, however, that a large proportion of the sugar had been lost by the repeated washing of the E.B. prior to the chemical analysis.

III. Rabbits were immunized with E.B. suspensions inactivated either by formaldehyde (0·3%) or by boiling for two hours. Rabbits received a six-weekly course of injections by the intraperitoneal route. All the sera developed agglutinin and precipitin antibodies. On the other hand, very little evidence of neutralizing antibodies could be detected, although some of the rabbits were subsequently found to be moderately resistant to the intradermal inoculation of fresh virus.

IV. Methods are described for the estimation of the numbers of E.B. in suspension in buffered solution. Highly constant and reproducible results were obtained by direct counts, by the Gates densitometer, and by the intradermal inoculation of susceptible animals with minimal infective doses. The results are analysed statistically.

V. Suspensions of washed E.B. were utilized to investigate the metabolism of a purified virus. The Warburg apparatus was employed for the determination of the consumption of oxygen and production of acid. Even when large amounts

of virus were used, the quantities of oxygen consumed and of CO_2 liberated were very small; moreover, they took place within the first hour. These findings are in sharp contrast to those recorded with resting bacteria.

VI. Hyperimmune flocculating sera were prepared against the S and LS antigens of vaccinia [see previous abstract]. L serum was obtained by absorbing the LS serum with the S antigen.

A stable substance was isolated from infected tissues in a relatively pure state. It was precipitated by the S serum in high dilution, but not by the L serum. This antigen contained 16·5% nitrogen and was therefore regarded as almost pure protein, but as it also gave a strong Molisch reaction it undoubtedly contained traces of carbohydrate.—R. E. GLOVER.

I. MACFARLANE, M. G., & SALAMAN, M. H. (1938). **The Enzymic Activity of Vaccinial Elementary Bodies.**—*Brit. J. exp. Path.* **19.** 184-191. 4 tables. [Numerous refs.]

II. AMIES, C. R. (1938). **The Production of Homogeneous Suspensions of Vaccinia Elementary Bodies and the Histology of the Associated Skin Lesions.**—*J. Path. Bact.* **47.** 205-222. 10 figs. on 4 plates, 1 table. [Numerous refs.]

III. PARKER, R. F. (1938). **Statistical Studies of the Nature of the Infectious Unit of Vaccine Virus.**—*J. exp. Med.* **67.** 725-738. 5 figs., 5 tables. [18 refs.]

IV. NELSON, J. B. (1938). **The Behaviour of Pox Viruses in the Respiratory Tract. The Response of Mice to the Nasal Instillation of Vaccinia Virus.** —*Ibid.* **68.** 401-412. 5 figs. on 1 plate, 5 tables. [9 refs.]

V. PICKELS, E. G., & SMADEL, J. E. (1938). **Ultracentrifugation Studies on the Elementary Bodies of Vaccine Virus. I. General Methods and Determination of Particle Size.**—*Ibid.* 583-606. 7 figs., 1 table. [Numerous refs.]

VI. SMADEL, J. E., PICKELS, E. G., & SHEDLOVSKY, T. (1938). **Ultracentrifugation Studies on the Elementary Bodies of Vaccine Virus. II. The Influence of Sucrose, Glycerol and Urea Solutions on the Physical Nature of Vaccine Virus.**—*Ibid.* 607-627. 5 figs., 1 table. [13 refs.]

I. Highly purified suspensions of vaccinia E.B. obtained by the differential centrifugation of a dermal rabbit strain were tested for the presence of various enzymes. Dehydrogenase activity was detected by the Thunberg technique using various dyes of the indophenol series, with negative results in all cases. Phosphatase and catalase activity, on the other hand, were positive in every sample which was tested. The possibility that soluble enzymes are adsorbed on the virus particle is discussed.

II. The nature of E.B. was determined by photographing suspensions in the Svedberg equilibrium centrifuge [*V. B.* **9.** 124.], and by dark-field examination. Dermal suspensions from rabbits inoculated with sheep lymph showed particles of varying size, whereas after serial passage through the rabbit, very homogeneous suspensions were produced.

Monodisperse E.B. suspensions, stored for 120 days, became polydisperse, although still producing good dermal lesions in rabbits. It is suggested that stored E.B. flocculate and then slowly dissociate into particles of a smaller molecular weight.

The histological changes produced by crude pulp were similar in type to those induced by E.B., but differed in degree. Cytoplasmic inclusions were scanty in the former, but were a conspicuous feature of the latter: moreover, there was a considerable reduction in the amount of infiltration following inunction with E.B. as compared with polidisperse suspensions.

III. Various suspensions of vaccinia virus (tissue culture, testicular vaccine, etc.) were inoculated intradermally into rabbits in dilutions which were closely spaced and approaching the minimum infective dose. The results, examined statistically, seemed to show that a single virus particle was capable of inducing infection.

IV. Mice were successfully inoculated with vaccine E.B. by intranasal instillation under ether. The mortality was from 34% to 72%, death being primarily due to an advanced pneumonia. Mice which developed symptoms but recovered were subsequently immune. The disease was readily transmitted by the the intranasal route, but not communicable by cohabitation. The distribution of the virus in the nasal passage, lungs and blood is described.

V. Suspensions of E.B. were centrifuged in the air-driven apparatus of BAUER and PICKELS [see p. 349.], and photographed by the Svedberg light absorption method. In a properly prepared monodisperse system a characteristic primary boundary was formed, frequently accompanied by several rapidly moving secondary boundaries. Irregular results were sometimes observed and were probably caused by auto-agglutination of the bodies in the region of this boundary. These studies suggest a particle diameter of the virus of 236-252 $m\mu$.

VI. Suspensions of E.B. in varying concentrations of sucrose, glycerol and urea solutions were subjected to ultracentrifugal studies. Variations in the sedimentation rate were observed indicating changes in the density of the particle size. The theory that the E.B. increase in density as a result of osmotic extraction of water is discussed.—R. E. GLOVER.

PIZZETTI, G. (1937). Sulla attività patogena del virus della peste aviare e sul suo potere cancerolitico. [**Pathogenic Action of Fowl Plague Virus**].—*Profilassi.* **10.** 69-70.

A brief account of work already published [*V. B.* **8.** 365].

KNAJTNER, S. (1938). O djelovanju natrijeve lužine, kaporita i formalina na virus difterije i boginja peradi. [**Action of Caustic Soda, Caporit and Formalin on the Virus of Fowl Pox**].—*Jugoslov. vet. Glasn.* **18.** 61-66. 2 tables. [13 refs.] [German summary].

K. concluded that filtered fowl pox virus was killed by a 0·1% solution of caporit in five minutes, and unfiltered virus in 30 minutes. When exposed to a 0·1% solution of formalin, the former was destroyed in five minutes, and the latter in one hour. Filtered virus became inactive in contact with a 1% solution of NaOH within five minutes, but when unfiltered it remained alive even after two hours. Hence he considers that both caporit and formalin are preferable to caustic soda as disinfectants for fowl pox virus.—B. OSWALD (KRIŽEVCI).

POLLARD, A. (1938). **The Chemical Composition of the Active Agent of the Rous Sarcoma No. 1.**—*Brit. J. exp. Path.* **19.** 124-129. 4 tables. [13 refs.]

P. describes a method for collecting the agent of Rous sarcoma No. 1 by the use of the Sharples centrifuge and its further purification by fractional centrifugation. It was found that purified suspensions contained about 40% lipoid material and about 15% nitrogen. Extraction of desiccated tumour tissue with benzene, ether, chloroform and other solvents yielded residues capable of producing tumours, and from which the active agent could be separated by fractional centrifugation. These preparations contained much less lipoid material, but there was no relation between the lipoid content and the activity. P. concludes that purified preparations of the agent consist mainly of protein with a small amount of lipoid material.
—J. E. WILSON.

CLAUDE, A. (1938). **Concentration and Purification of Chicken Tumour I Agent.** —*Science.* **87.** 467-468. [7 refs.]

C. describes a method of preparing a Tumour I agent which exhibits a higher tumour-producing power than the original tumour. The method consists in serial extractions from frozen tumour tissue and subsequent purification of the extracts in a high speed centrifuge. The purified fraction obtainable from 1 g. of fresh tissue was about 2·2 mg. The chemical properties of the active agent are discussed in detail. It was not determined whether the lipoid material present was related to the tumour-producing property, but it is suggested that nucleic acid may be an important constituent of the agent. The presence of an inhibitory factor is discussed.—J. E. WILSON.

FURTH, J., & BREEDIS, C. (1937). **Attempts at Cultivation of Viruses Producing Leukosis in Fowls.**—*Arch. Path.* **24.** 281-302. 6 figs., 13 tables. [Numerous refs.]

The authors investigated the conditions necessary for the propagation *in vitro* of certain leucosis- and tumour-producing viruses. Previous work is discussed and methods employed are detailed. It was shown that virus 1, which is capable of setting up erythroleucosis and myeloid leucosis, could be cultivated by growing the cells produced by it (myeloblasts from bone-marrow, etc.) on solid and fluid media. Myeloblasts remained viable in culture up to 62 days, and all cultures in which they were present produced leucosis. In one experiment, myeloblasts disappeared from culture during the first few weeks and only fibroblast-like cells remained ; these failed to produce leucosis. It was found that virus 1 did not survive in the presence of sarcoma cells.

In experiments with virus 13, which was capable of producing both leucosis and sarcomata, sarcoma cells from a breast muscle tumour of this type were grown *in vitro* for 158 days. Inoculations with cultures showed that this dual property had not been lost and that the virus had a stimulating effect on primitive blood cells and fibroblasts. The virus did not survive in the presence of normal fibroblastic cells of embryonal and adult tissue. After the first passage leucocytes disappeared and cultures were composed of fibroblastic-like cells which were capable of producing leucosis and osteochondrosarcoma. Osteogenesis was not observed *in vitro.* Virus 12 which produced osteochondrosarcoma and lymphomatosis was also studied.

The authors conclude that oncogenic viruses multiply *in vitro* only in the presence of cells on which they confer neoplastic properties.—J. E. WILSON.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

CURSON, H. H., & NEITZ, W. O. (1937). **The Approximate Distribution of the Genus Glossina.**—*Onderstepoort J. vet. Sci.* **9.** 101-104. [6 refs.]

The compilation of the map accompanying this paper arose from a desire to demonstrate at a glance to veterinary students the approximate distribution of the genus *Glossina.* No map could be discovered giving the information in this form. An appeal for data was made to the administrations of the various territories concerned, and there was a generous response. Even within the area showing the distribution of the genus *Glossina* there are regions, *e.g.* in the Gold Coast and Cameroons, from which tsetse flies are absent and where cattle abound. The geographical distribution as shown in the accompanying map is at least as satisfactory as in any previous one.—E. M. ROBINSON.

LLOYD, H. M. (1938). **The Occurrence of** *Glossina morsitans* **in Tanganyika Territory in Vegetational Types other than the** *Isoberlina-Brachystegia* **Communities.**—*Bull. ent. Res.* **29.** 77-98. 3 text figs., 10 figs. on 2 plates, 8 tables. [17 refs.]

The classical habitat of *Gl.m.* is an *Isoberlina-Brachystegia* community (miombo). The fly has occasionally been reported from other vegetation types, however. A study of relations to some of these unusual habitats, in north and north-east Tanganyika during part of 1933 and 1935, showed that the species apparently inhabits several types of plant community other than miombo. Sixteen types are described, in 11 of which flies were found. Five of these are regarded as favourable to the fly. The species was also caught in abandoned banana plantations which were reverting to the natural state, but it was demonstrated by experiment that the fly disliked cultivated plantations.—J. MACLEOD.

CAMPBELL, T. G. (1938). **Recent Investigations on the Buffalo Fly** (*Lyperosia exigua* **de Meijere) and its Parasites in North Australia.**—*J. Coun. sci. industr. Res. Aust.* **11.** 77-82. 3 tables, 1 map. [2 refs.]

No evidence was obtained that the buffalo fly had been affected in its incidence or its effect upon stock by the introduced parasite *Spalangia sundaica.* All parasites recovered and identified in 1936 were of the local species *Sp. orientalis*; thus it would seem that the introduced species either failed to survive or was submerged by interbreeding with the indigenous form.—D. A. GILL.

RAY, H. M. (1938). **Tick Fever in Domesticated Animals in India.**—*Agric. Live-Stk India.* **8.** 347-360. 19 figs. on 1 plate.

An article written for laymen.—L. E. HUGHES.

LARSON, C. L. (1937). **The Tick Parasite** *Ixodiphagus texanus* **in Nymphs and Larvae of** *Haemaphysalis leporis-palustris* **in Minnesota.**—*J. Parasit.* **23.** 496-498. [11 refs.]

L. speaks of attempts to control ticks by means of parasites to which they are subject and deals with two of them, both chalcids, *I.t.* and *Hunterellus hookeri.* He discusses the incidence of these parasites in ticks. A number of larval ticks showed definite external changes associated with the parasitism.

BARTELS, & ROSENBERGER. (1937). Neuere Massnahmen zur Bekämpfung der Schafräude. [**New Control Measures for Sheep Scab**].—*Dtsch. tierärztl. Wschr.* **45.** 273-281. 16 figs., 1 table, 1 graph.

An account of a campaign, more energetic than any previously carried out in Germany, in which all sheep in a particular area of heavy infection in North West Germany were submitted to a lime-sulphur dipping, steps being taken at the same time to isolate the area from contamination from outside. Eradication was achieved by this method.

Details of various types of dipping tanks and of the preparation of the dipping fluid are given.—J. E.

TARANTINO, G. (1937). Sulla caratteristica rogna delle zampe dei polli e sulla sua trasmissibilità all'uomo. [**Scaly Leg in Fowls and its Transmissibility to Man**].—*Azione vet.* **6.** 835-838. [Numerous refs.]

After reviewing previous authorities on this disease in fowls, T. points out that it has been asserted by some, and denied by others, that it is transmissible to man. He made two experiments on himself, and two on other volunteers. Scales

were taken from badly infected fowls and were proved infective to other fowls. T. experimented first on one finger and then on an arm, the skin being previously scarified and the infected material being kept in contact in the one case for 15, and in the other for 20 days. There was not the slightest trace of any infection. The results in the other two volunteers were also negative.—S. F. J. HODGMAN.

I. IWANOFF, X. (1937). Ueber die Verbreitung der Linguatula serrata unter den Hunden in Bulgarien. [*Linguatula serrata* **in Dogs in Bulgaria**].—*Z. InfektKr. Haustiere.* **51.** 191-202. 1 table. [16 refs.]

II. IWANOFF, X. (1937). Ueber die Verbreitung der Linguatulose unter den Ziegen in Bulgarien. [**The Incidence of Linguatula in Goats in Bulgaria**].—*Ibid.* **52.** 79-84. 1 table. [8 refs.]

I. The author examined 450 dogs, varying in age from three months to 11 years, for *Linguatula* infestation. In all, over 40% of the dogs harboured the parasites, the degree of infestation running approximately parallel with the age of the animal. The youngest animal in which parasites were found was four months old. As many as 41 parasites were found in a single dog. Over 40% of the affected animals harboured only male or sexually immature parasites, so that examination of the nasal secretion might often fail to show the presence of the eggs.

II. The jejunal lymph nodes of 200 goats between 1-10 years old were examined for the presence of *Linguatula* larvae. The incidence of infestation (78%) was lower than in sheep (98%), and this is probably due both to the closer relation between the sheep and sheep dogs and to the grazing habits of sheep. As many as 60 living larvae were found in 1 g. of lymph node.—E. G. WHITE.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

PEGREFFI, G. (1937). Lotta contro le malattie parassitarie del bestiame in Sardegna. (Nota preventiva). [**Control of Helminth Infestations of Animals in Sardinia**].—*Azione vet.* **6.** 750-752. 1 table.

Details are given of the prevalence of various parasitic diseases of cattle in Sardinia, and the results of a three years' (1935-1937) official control campaign. The anthelmintics employed were distributed free of cost, the only charge made being a small one for the services of the veterinarians employed to examine and treat the infected animals. By far the largest number of treatments were for distomatosis in sheep. The results were considered encouraging.—S. F. J. H.

I. PENSO, G. (1937). La calciocianamide nella lotta contro la distomatosi. [**Control of Fascioliasis with Calcium Cyanamide**].—*Clin. vet., Milano.* **60.** 711-713.

II. NEGRI, R. (1937). La calciocianamide nella lotta contro la distomatosi. [**Control of Fascioliasis by Calcium Cyanamide**].—*Profilassi.* **10.** 227-229.

I. It was found that $CaCN_2$ destroyed the ova, embryos and larvae of *Fasciola*, and also destroyed infested snails. At the same time it served as a valuable manure, and the cost was very low. The best effect was obtained by employing $CaCN_2$ at the end of the winter, before the young animals were driven out to pasture. Quantities of 1-3 cwt. per 100 square metres represent 4-12 times the toxic doses for snails and developing *Fasciola*.

II. A mixture of $CaCN_2$ with equal parts of powdered, sifted earth proved very poisonous for the intermediate snail host of *Fasciola*, and would also destroy

larvae of insect vectors. The cyanamide is dissolved by the soil and rain water and forms HCN and $Ca(OH)_2$; from these urea is formed, which is a useful artificial manure. The calcium cyanamide should be spread in winter and spring in quantities of 1-2 cwt to every 100 square metres.—HANS GRAF (ZÜRICH).

VILJOEN, N. F. (1937). **Cysticercosis in Swine and Bovines, with Special Reference to South African Conditions.**—*Onderstepoort J. vet. Sci.* **9.** 337-570. 17 figs., 35 tables, 1 map, 4 charts. [Numerous refs.]

Extensive statistical records collected from South African abattoirs are used to study the distribution and incidence of measles in pork and beef in the country. The former reaches 25% and the latter is rarely more than 5%. Similar very extensive records have been obtained from most other parts of the world, and these are analysed.

About 80% of measly pig carcasses are heavily infested, but bovine infestations are usually light and require very thorough inspection for their detection. It has been found that the hind limbs and the hump of cattle are important predilection sites, and V. strongly advocates a deep cut into the adductor muscles, parallel to and just behind the pelvic symphysis, as well as a cut into the hump.

Viability tests performed during 12 months, by Keller's method, on a large number of carcasses and measles, showed that *C. cellulosae* in carcasses did not survive more than four days' freezing at approximately −10°C., and *C. bovis* similarly did not survive more than five days.

The incidence of human infection with both tapeworms in the native and European populations is relatively high in South Africa. Cases of psychosis due to tapeworm infestation are mentioned, while the occurrence of human epilepsy as a result of cerebral cysticercosis would appear to be more frequent than is generally known.

The epidemiological aspect of the problem is discussed and measures are suggested for control and eradication of the infection.—H. O. MÖNNIG.

MEIJER, W. C. P. (1937). Over een lintworm van hond en kat, Diphyllobothrium (spirometra) erinacei (Rudolph, 1819) en het bijbehoorende plerocercoid. [*D.e.* **of the Dog and Cat and its Plerocercoid**].—*Ned.-ind. Bl. Diergeneesk.* **49.** 370-380. 1 fig. 7 tables. [12 refs.]

In the Dutch East Indies the plerocercoid of *D.e.* was found in human beings, frogs, rats, pigs and *Crocidura sp.* The full-grown tapeworm *D.e.* occurs in dogs and especially in cats, the latter becoming infested through eating frogs. The occurrence of *D. latum* in the Dutch East Indies has not yet been proved.

—JAC. JANSEN (UTRECHT).

MOULAERT. (1938). De la fréquence de la ladrerie chez nos animaux de boucherie. [**Incidence of Cysticercosis in Slaughter Animals in Belgium**].—*Echo vét., Gembl.* **67.** 66-70. 1 table.

M. analyses the results of a systematic search for cysticercosis in all animals slaughtered in Bruges during the four years of the German occupation to November, 1918. One case of *C. cellulosae* of the pig and 154 cases of *C. bovis* in cattle were determined. No data upon which to assess the incidence of cysticercosis were available.—C. V. WATKINS.

OLSEN, O. W. (1938). **Anoplocephaliasis in Minnesota Horses.**—*J. Amer. vet. med. Ass.* **92.** 557-559. [11 refs.]

The discovery of 12 specimens of *A. magna* in a five-month-old colt is recorded.

Only five cases of anoplocephaliasis have been noted in Minnesota in the past 20 years, two of *A. magna*, and three of *A. mamillana*. *A. perfoliata* has not been recorded.

The life-cycle of these worms has not been completely demonstrated, but STUNKARD's work [*V. B.* **5.** 359, and **8.** 443.] suggests that an intermediate host is necessary.—D. D. OGILVIE.

SEN, S. C. (1936). **Development of Adult Taenia Echinococci in a Hydatid Cyst in the Muscle of a Sheep.**—*Calcutta med. J.* **31.** 38-40.

S. reports the unusual finding of a cyst about the size of an acorn containing full-grown *T.e.*, in mutton bought in a Calcutta market.

YMAZ APPHATIE, I. L. (1937). Purificación de la toxina y anatoxina hidática. [**Purification of Hydatid Toxin and Anatoxin**].—*Prensa méd. argent.* **24.** 1731-1733. [Copied *verbatim* from *Trop. Dis. Bull.* **35.** 223-224. Signed H. H. S.]

When hydatid fluid is treated with trichloracetic acid albumen is precipitated; this is separated quickly and redissolved in alkali. The acid precipitates, at *p*H 4 or lower, the toxalbumins and anatoxin, which are separated by centrifuging, redissolved in solutions of carbonate and phosphate of sodium and made up to the original volume by normal saline.

The author's technique for separating the hydatid toxalbumin is as follows :–

To the transparent hydatid fluid, *p*H 6·7, are added 4 drops of normal solution of trichloracetic acid for each c.c. of fluid, the *p*H reduced to about 3, the product being then shaken and put aside for 10 minutes when a fine turbidity forms which is thrown down by centrifuging. The precipitate is dissolved in 0·9 per cent. NaCl with addition of 4 drops of normal Na_2CO_3 and the *p*H becomes 6·5. The amount of saline employed is one-fifth of the hydatid fluid, so that the albumen is in a five-fold concentration.

For separation of the anatoxin :–

To 10 c.c. of the anatoxin of *p*H 6·3 are added 10 drops of normal trichloracetic acid; the mixture shaken and in 10 minutes a suspension forms which is thrown down by centrifuge, redissolved in 0·9 per cent. NaCl (one-fifth of the original volume) and one drop of normal Na_2CO_3; the product is purified and five-fold concentrated anatoxin with *p*H 6·6.

The supernatant fluid after centrifuging off the precipitate formed with the trichloracetic acid is neutralized with normal Na_2CO_3, 2 drops for each c.c., and the resulting fluid, of *p*H 6·4, contains the saccharide fraction of the liquid.

The albuminoid fraction gives more intense intradermal reactions than does the pure hydatid fluid; the saccharide fraction also more than the pure fluid but less than the albuminoid fraction, in fact intermediate. Similarly the albuminoid fraction has a much higher specific antigenic potency than the saccharide fraction.

PORTER, D. A. (1937). **An Increase in the Proportion of Basophilic Leucocytes in Guinea Pigs Experimentally Infected with Swine Lungworms.**—*J. Parasit.* **23.** 73-82. 3 figs. [7 refs.]

The larvae of swine lungworms were obtained from the oesophagus of the "most common earthworms in the U.S.A.", the stinking earthworm, *Helodrilus foetidus*, and fed in definite numbers to young uninfested g. pigs. All the worms recovered P.M. from the g. pigs were *Metastrongylus elongatus*. Differential leucocyte counts were made and details are given graphically of the fluctuations in the number of neutrophiles, lymphocytes and basophiles. The number of basophiles in the blood increased markedly after the infestations, the peak coming between the seventh and 17th days, but then quickly returned to normal. G. pigs killed and examined at this stage showed signs of having had worms in the lungs,

though none were actually recovered. It appears that the proportion of basophiles circulating in the blood and in the tissues of the lungs is directly correlated to the presence of the worms. It also seems possible that the proportion of basophiles may be directly proportional to the number of larvae fed, and that the percentage of these cells may not increase to the same extent following reinfestation, as they do after the initial infestation.

PRITCHETT, H. D. (1938). **Lung Worms in a Kitten.**—*J. Amer. vet. med. Ass.* **92.** 692-694. [2 refs.]

A fatal infestation with *Aleurostrongylus abstrusus* in a kitten is recorded. Acute fever and intermittent halitosis were noticed before death. Autopsy revealed lesions which were confined exclusively to the lungs, and which consisted of extensive chronic parasitic pneumonia with almost complete solidification, calcification around the parasites, and extreme thickening of the arterial walls. An adenomatous condition also occurred in some areas, the neoplastic cells originating in the bronchial epithelium.—D. D. OGILVIE.

ABDUSSALAM, M. (1938). **On the Occurrence of *Skrjabinema ovis* (Skrjabin, 1915) in India.**—*Proc. Ind. Acad. Sci.* **8.** 15-17. 1 table. [10 refs.]

A. describes two living specimens of *Sk.o.* passed in a speck of mucus by a sheep with diarrhoea. Their measurements compare with those of British and Russian specimens. The infested sheep was from an indigenous flock. It is stated that the infestation was probably introduced from Turkestan before the 19th century.—R. FISHER.

TAYLOR, E. L. (1938). Les gastrites parasitaires. Étude des larves de trichostrongylidés parasitaires dans les pâturages. [**A Study of the Larval Stage of Trichostrongyles on Pastures**].—*Bull. Off. internat. Epiz.* **16.** 181-194. Discussion pp. 281-284.

A proportion of larvae of trichostrongyles remain viable on pastures for as long as nine months. They are capable of penetrating 5 cm. beneath the surface under favourable conditions, and show some selectivity as to the type of herbage parasitized. Most infected pastures contain 200 larvae per lb. herbage, rising to 1,000-2,500 on very heavily infested areas. It is noted that the number of larvae ingested is inversely proportional to the quantity of the herbage available, close cropping causing heavy infestation. Animals of non-susceptible species, if allowed to graze on the pastures, reduce the number of larvae considerably.—P. S. WATTS.

ANDREWS, J. S. (1938). **Effect of Infestation with the Nematode Cooperia Curticei on the Nutrition of Lambs.**—*J. agric. Res.* **57.** 349-361. 1 fig., 8 tables. [Numerous refs.]

The investigation shows that infestations with a relatively non-pathogenic nematode decrease the ability of infested lambs to convert their food into gain in weight, even when these lambs are in excellent nutritional condition and show no clinical symptoms of parasitic infestation. Evidence is presented to show that this decrease in efficiency is due to an increased energy metabolism, apparently resulting in reduced use of the food for growth or gain. This increased energy metabolism may be accounted for by the nervous excitation of the host due to the irritation of the intestinal mucosa by the worms in the intestine, by the production of areas of inflammation wherever the mucosa has been injured by the larvae and wherever a tissue reaction of the partially resistant host to the foreign protein of the parasite occurred, and by the possible, although undemonstrated, accumulation of guanidin in the blood of the infested lambs.—R. FISHER.

WEHR, E. E. (1937). **Observations on the Development of the Poultry Gapeworm** *Syngamus trachea.—Trans. Amer. micr. Soc.* **56.** 72-78. 16 figs. on 1 plate. [3 refs.]

According to the observations made by W., the embryo of *S.t.* moults twice in the egg and hatches as a third stage larva which is infective for chicks or earthworms, developing to an adult in the chick, and persisting as an infective third stage larva in the earthworm. The first moult in the egg takes place on the fifth day, and the second moult on the seventh day, in cultures incubated at a temperature ranging from 24°-30°C.

W. fed chicks with embryonated eggs (containing third stage larvae) or with infected earthworms, and examined them after various intervals.

Third stage larvae were found in the liver and lungs of one bird, and fourth stage larvae in the lungs of others. It was also observed, in further experiments, that young adult worms appeared in the lungs and copulated there before migrating to the trachea.

The six stages of the life-cycle are described and illustrated.—J. E.

PROMMAS, C., & DAENGEVANG, S. (1937). **Feeding Experiments on Cats with** *Gnathostoma Spinigerum* **Larvae Obtained from the Second Intermediate Host.**—*J. Parasit.* **23.** 115-116. 2 figs.

Attempts were made to determine the kinds of freshwater fish that might act as second intermediate hosts of *G.s.*, and also to infect the definitive host with larvae obtained from the second intermediate host.

Young freshwater fish (*Ophicephalus striatus*) were experimentally infested with *G.s.* larvae, and three cats were later fed grown, non-encysted larvae from these fish. By faecal and P.M. examination 180 days after feeding, one cat was proved not to be infested. The second cat proved to be infested on faecal examination 223 days after feeding, and 39 days later P.M. examination revealed a nodule in the gastric wall containing two adult females and one adult male worm. The third cat proved to be infested on faecal examination 198 days after feeding, and P.M. examination 66 days later revealed a tumour in the stomach wall containing four adult males and four adult female worms.

The authors describe the life-cycle of *G.s.* as demonstrated by these studies.

I. STRONG, R. P. (1938). **Onchocerciasis in Africa and Central America.**—*Amer. J. trop. Med.* **18.** Suppl. to No. 1. 1-57. 44 figs., 2 tables. [Numerous refs.] [See also *V. B.* **8.** 446].

II. SANDGROUND, J. H. (1938). **Helminthological Observations and their Bearing on Certain Aspects of the Biology of Onchocerca.**—*Ibid.* 91-107. 4 figs., 1 table.

I. Further studies carried out in Africa regarding onchocerciasis are reported. Observations were made particularly in the provinces of Lusambo and Elisabethville, and in Northern Rhodesia. A comprehensive survey of onchocerciasis of the native population was made. The incidence of infection was very high, probably over 95%.

Infected human beings constitute the most important focus of infection, and eradication of the disease is difficult. S. considers that measures against the larvae and pupae of *Simulium* can only be partially successful ; and more can be accomplished by surgical or medical treatment of infected persons. A number of animals were examined to discover whether another mammalian host exists, and it seems possible that a species of antelope, and also cattle, may occasionally act as reservoir hosts in some areas.

He emphasizes the importance of the discovery of free adult parasites in man, and suggests that human species of *Onchocerca* may occur in the ligamentum nuchae and tendons as in horses, cattle and other mammals. Further autopsies are necessary before a more definite opinion can be given.

II. The lack of morphological difference between the various species of *Onchocerca* is stressed ; it is consequently not clear whether the species are host-specific or not. In Africa the specificity of bovine onchocerciasis is by no means as clear as in other regions. Enquiry was made, therefore, into the possibility of ruminants being a source of human onchocerciasis in Africa, and also into the more exact bionomics of the parasites.

Few cattle are maintained in the area examined, and onchocerciasis was absent from the one large herd of the district ; village goats, also, were free from infection. However, in wild buffaloes (*Syncerus caffer*) about 200 miles away, *O. syncerus*, a new species, was discovered in the loose areolar tissue near the cervical ligamentum nuchae. The new species is described and differentiated from *O. gutturosa* to which it appears closely related. *O.g.* is recorded from one of the buffaloes, and also the related nematode *Elaeophora poeli*. The examination of numerous other wild mammals failed to reveal evidence of onchocerciasis.—D. D. Ogilvie.

I. Faust, E. C. (1937). **Mammalian Heart Worms of the Genus Dirofilaria.** —*Festschrift Bernhard Nocht, 1937.* 131-139. 1 fig., 1 table. [Numerous refs.] Hamburg : Friederichsen, de Gruyter & Co. [In English].

II. Feng, L. C. (1937). **Attempt to Immunize Dogs against Infection with** *Dirofilaria immitis* **Leidy 1856.**—*Ibid.* 140-142. [8 refs.] [In English].

III. Live, I., & Stubbs, E. L. (1938). **The Diagnosis of Filariasis in the Dog.** —*J. Amer. vet. med. Ass.* **92.** 686-690. 1 table. [3 refs.]

IV. Yen, C. H. (1938). **Studies on** *Dirofilaria immitis* **Leidy, with Special Reference to the Susceptibility of some Minnesota Species of Mosquitoes to the Infection.**—*J. Parasit.* **24.** 189-205. [13 refs.]

V. Lane, C. (1938). **Drug-Induced Sterility of Female Filarial Worms.**—*Vet. J.* **94.** 158-161. [4 refs.]

I. A collection of *Dirofilaria* species made in China and in New Orleans from the dog, cat, wolf, fox, and California sea-lion is discussed.

D.i. occurred frequently in dogs. Quantitative microfilarial studies confirmed that the type of curve representing the numbers of microfilariae present in peripheral blood at different times over 24 hours is essentially the same as previously reported in the literature ; but they were in disagreement with the contention that the periodicity curve is relatively constant, since there was considerable variation in the time at which the low and the high phases of the curve were reached.

In cats there was a greater tendency for *D.i.* to migrate into the pulmonary arteries, the parasite even invading the respiratory passages.

Morphological differences between *D. repens* of the sea-lion and the other members of the genus are noted, and it is proposed that this species be placed in the sub-genus *Nochtiella*, *D. immitis*, *D. magalhaesi*, *D. pongoi* and *D. spirocauda* (*vel immitis*) becoming members of the sub-genus *Dirofilaria*.

II. Two experimental dogs were injected subcutaneously with a 10% emulsion of adult *D.i.* One received two injections of 1 c.c. of male worm emulsion each week for ten weeks, and was then inoculated (subcut.) with nine mature larvae ; *D.i.* were found in the heart eight months later. The other dog received 39 doses each of 1 c.c. of female worm emulsion. Towards the end of the course of injections the test dose was given. The dog died two months after the end of the injections, and no worms were detected on autopsy. An immunized control

was given infective larvae and became infested in the same degree as the animal treated with emulsion of male worms. F. considers, therefore, that the possibility of complete immunization against *D.i.* by this method is still remote.

III. The efficiency of concentrating microfilariae in blood sera and in whole blood was compared.

From 5 c.c. of whole blood, 0·5 c.c. was immediately mixed with 5 c.c. of 5% glacial acetic acid. The remainder of the blood was allowed to coagulate and 0·5 c.c. of its serum was mixed with a further 5 c.c. of acetic acid. Examination after centrifuging showed that there were more than twice as many microfilariae in the serum than in the equal volume of whole blood. For the diagnosis of filariasis, therefore, the use of blood serum in preference to whole blood is advocated.

IV. Experiments have shown that not all mosquitoes are suitable intermediate hosts for *D.i.* The susceptibility of some Minnesota species was therefore tested, care being taken to trace the development of the microfilariae in each species. *Aedes stimulans*, *A. cinereus*, *A. canadensis*, *A. vexans*, *Anopheles punctipennis*, and *An. maculipennis* proved very susceptible to infection. *Culex tarsalis*, *C. territans*, and *C. pipiens*, however, had a low susceptibility, and *A. tricittatus*, *Theobaldia inornata*, and *Taeniorhynchus perturbans* gave negative results under laboratory conditions.

Accounts are given of the method of escape of the larvae from the labium of the mosquito, the tissue changes in the infested insect, and also of the encapsulation of the parasite ; the capsule being pigmented.

V. It has been shown that the rise of the periodic microfilarial blood tide in filarial infestations is due to synchronized parturition by the female worms. Death or sterilization of the latter relieves the host. Concentrated fouadin given in doses of 0·45 c.c. to 1 c.c., rising to 0·9 c.c. to 2 c.c., on alternate days to dogs infested with *D.i.* sterilized all and killed some of the female worms. Small increases in dosage caused dangerous toxic manifestations.—D. D. Ogilvie.

IMMUNITY

Doig, A. T., Gemmill, G., Kayne, G. G., Linggood, F. V., Parish, H. J., & Westwater, J. S. (1938). **Laboratory and Clinical Investigations on Tuberculin Purified Protein Derivative (P.P.D.) and Old Tuberculin (O.T.)** —*Brit. med. J.* May 7th. 992-997. 7 tables. [Numerous refs.]

In order to produce a highly active but non-sensitizing tuberculin, the authors use Seibert's " SOTT ", *i.e.*, synthetic medium old tuberculin purified by filtration through collodion membranes and precipitated with trichloracetic acid. The precipitate is dried by ether and is then in stable powder form of quite consistent potency. It is issued as the powder together with borate buffer solution as solvent, standardized to equal various strengths of old tuberculin. It was found by clinical trials on man that the g. pig was quite suitable as a test subject for standardization and gave comparable results to those in man.—P. S. Watts.

Pochon, J. (1938). Recherches sur la floculation des sérums anticharbonneux. **[The Flocculation of Anti-Anthrax Sera]**.—*Rev. Immunol.* **4.** 457-468. 1 table, 5 graphs. [Numerous refs.]

Flocculation phenomena were studied using mixtures of increasing volumes of two anti-anthrax sera with 1 c.c. of filtrate from two-, five- and eight-day-, and one- and two-month-old broth cultures of two capsulated and three non-capsulated anthrax strains. The double-zone flocculation obtained with young capsulated

cultures is graphically illustrated by two fused curves which become separate parabolas with older cultures. The tubes of earliest flocculation for the filtrates of different age against the same serum could be graphically represented by two equilateral hyperbolas. A single parabola was obtained for all filtrates of non-capsulated strains. The preparation of the various antigenic fractions and the type of flocculation obtained with them are described. A table demonstrates the inconstancy, during immunization, of the relation between the amounts of somatic and of capsular antibodies in the serum.—R. O. MUIR.

WEINBERG, M., & GUILLAUMIE, M. (1938). Titrage des sérums antigangréneux (anti-*perfringens* C, anti-*perfringens* D, anti-histolytique et anti-vibrion septique). [**The Titration of Antisera to** *Clostridium welchii*, *Cl. histolyticum* **and** *Cl. septique*].—*C. R. Soc. Biol. Paris.* **127.** 1084-1088. 2 tables. [1 ref.]

Six anti-*welchii* sera of Types C and D gave inconstant results when titrated against units consisting of 20 M.L.D. of various homologous toxins. A Danish and a French standard serum were both suitable for establishing a test dose of *Cl. histolyticum* toxin. A maximum difference of 15% occurred in titrations of a *histolyticus* antiserum, with test doses of different *histolyticus* toxins, and differences of 10-20% were obtained in titrations of a *septique* antiserum with test doses of four homologous toxins.—R. O. MUIR.

FITCH, C. P., ROEPKE, M. H., & THOMPSON, C. M. (1937). **Studies of Physical Properties and Agglutinability of** *Br. abortus* **Plate Antigens from Several Sources. II.**—*Cornell Vet.* **27.** 366-373. 6 tables. [4 refs.] [See also *V. B.* **7.** 211].

Further studies of plate antigens obtained from commercial manufacturers and official laboratories showed that wide variations still existed in their physical properties and agglutinability. As in the previous examinations, the colour, relative viscosity, surface tension, and bacterial concentration of the antigens were determined, and the relative sensitivity was calculated. Antigens obtained from the same sources as those tested 16 months previously showed a marked change in sensitivity in a number of cases, but fewer relative differences in the same batch. Uniform methods of production and use would simplify and increase the efficiency of Bang's disease control plans in the various States.—S. J. GILBERT.

GINS, H. A., KROEMER, G., & LINK, T. (1938). Untersuchungen über die ersten Reaktionsabwehrerscheinungen in der infizierten Haut. [**The First Defence Reactions of the Infected Skin**].—*Zlb. Bakt. I. (Orig.).* **142.** 225-250. 12 figs. [7 refs.]

Observations were made on the reaction of the skin of normal and immunized g. pigs to the intradermal injection of bacteria, diphtheria toxin and vaccinia virus. Histological sections of the skin were prepared from samples at varying intervals after the injection. Vascular changes at the site of injection were observed as early as half an hour after the injection: they comprised leucocytosis with diapedesis and the formation of a perivascular cellular infiltration. It is suggested that the cellular response as seen in and around the vessels cannot be explained on the basis of chemotaxis, but appears to result from a central effect: whether this is brought about by the central nervous system, by hormones, or by other means is not known. Phagocytosis is to be regarded as a non-specific reaction, although different types of leucocyte are involved according to the organism concerned. In immunized animals there was both increased phagocytosis and an increased effect on the injected organisms by substances present in the tissue fluids. No

support was obtained for the view that certain cells of the reticulo-endothelial system are the bearers of specific immunity.—E. G. WHITE.

KUROTCHKIN, T. J., & BENARADSKY, C. V. (1938). **Serological Diagnosis of Contagious Bovine Pleuro-Pneumonia Through the Use of the Specific Carbohydrate of** *Asterococcus mycoides*.—*Chin. med. J.* Suppl. No. 2. pp. 269-278. 1 table. [6 refs.] [In English].

From cultures of the organism of contagious bovine pleuro-pneumonia, the authors obtained a specific carbohydrate substance which reacted with sera from rabbits immunized with whole cultures of the organism. It was found that this carbohydrate substance was liberated into the blood in natural cases of the disease, and it could be detected by a precipitin ring test which developed when immune rabbit serum was added to the blood of the bovine host. Antibodies could also be demonstrated in the blood against this substance.

The authors consider that the absence of immunity in the case of certain recovered animals may be due to the neutralization of the antibodies by circulating specific carbohydrate substance.—D. L. HUGHES.

MAGARA, M. (1936). Sur l'action de l'hormone sexuelle contre l'infection. [**The Part Played by Sex Hormones in Resistance to Infection**].—*C. R. Soc. Biol. Paris.* **121.** 1193-1194.

M. investigated the influence of sex hormones on immunity to pneumococcal infections in mice. Experiments showed that male hormones exerted a defensive action specific to male mice as do female sex hormones in female mice.

HÖRING, F. O. (1937). Endokrine Krankheiten und Infektionsresistenz. [**Relation Between the Endocrine Diseases and Immunity**].—*Ergebn. inn. Med. Kinderheilk.* **52.** 336-374. 17 tables. [Numerous refs.] [Abst. from abst. in *Bull. Inst. Pasteur.* **36.** 40].

H. points out the indirect influence of hormones on resistance to infection, in that they affect the composition, metabolism and general properties of the blood and tissues. Work is required on the action of individual hormones in relation to particular infections. Epidemiological data, and a study of skin and pulmonary infections failed to prove any lowered resistance in subjects with endocrine diseases. However, it was noted that in such patients some diseases, *e.g. Streptococcus pyogenes* infection, tuberculosis, and *Bacterium coli* infection, were more severe than in patients in whom the endocrine system was normal.

DISEASES, GENERAL.

I. MÜSSEMEIER. (1938). Considérations sur la prophylaxie des épizooties qui peuvent etre visées par une intervention administrative. [**Administrative Intervention in the Prophylaxis of Epizootics**].—*Bull. Off. internat. Epiz.* **16.** 122-134. Discussion pp. 292-306.

II. VERGE, J. (1938). Etude d'une réglementation sanitaire applicable à toutes les maladies susceptibles d'une intervention administrative. [**Sanitary Regulations Applicable to all Diseases Controllable by Legislation**].—*Ibid.* 135-148. Discussion pp. 292-306.

I. A review of the conditions under which administrative intervention is applicable to the control of epizootic disease in animals, and a consideration of the principles upon which legislation should be based. M. examines critically the

means at our disposal for the prevention and control of the most important epizootic diseases. He considers that under certain conditions a slaughter policy is justified for foot and mouth disease, contagious bovine pleuro-pneumonia, sheep scab, dourine, swine fever, rinderpest and equine infectious anaemia. He reviews the dangers and the permissibility of active immunization in diseases where this procedure is applicable. Aids in control, such as chemotherapy afford as yet little hope of success, except in certain protozoan and parasitic infections. M. concludes with a consideration of the responsibilities of stockowners regarding the adoption of general hygienic measures, and the means for their instruction.

II. A consideration on more general lines of most of the matter cited in the previous abstract. A list of the notifiable diseases in France is given, *viz* anthrax, bovine tuberculosis (of the lungs, intestine, udder and uterus), glanders, swine erysipelas and " pneumo-enteritis," ovine and caprine brucellosis, blackleg, dourine, bovine anaplasmosis, F. & M. disease, rinderpest, contagious bovine pleuro-pneumonia, sheep pox, equine infectious anaemia, rabies, psittacosis and mange. V. concludes by formulating certain principles by which veterinary police legislation should be guided for organizing obligatory, facultative and voluntary prophylaxis.—N. J. SCORGIE.

SCHÄPER, W. (1937). Allergie und Konstitution. [**Allergy and Constitution**]. —*Z. Zücht. B.* **139.** 163-195. [Numerous refs.]

GENERAL.—S. surveys the field of comparative pathology in an attempt to point out the connexion between allergy and many diseases of domestic animals. He discusses the meaning of the terms allergy, anaphylaxis, serum sickness, idiosyncrasy and atopia, and suggests that they are all classifiable under the term allergy as defined (but modified by S. to have a wider scope) by VON PIRQUET in 1906, because they are forms of inherited " modified reactability " to the action of antigens, which include foreign matter of any kind. Research on human beings has shown that a general allergic predisposition to a number of antigens is common in man and is perhaps inherited as a simple dominant character, though not all affected persons show signs of it (probably because some of them merely do not happen to be exposed to the antigen in question). S. prefers to apply to those antigens which bring about allergic diseases the term " allergens ", and he specifies five postulates in connexion with their identification. [He breaks new ground in animal pathology by suggesting that the diseases mentioned below have an allergic origin. Direct supporting evidence is as yet very scanty, but indirect evidence concerning analogous human diseases is available and is referred to in the text].

He puts forward the following tentative and incomplete list of special allergic conditions in domestic animals :–

A. ALLERGIC SKIN DISEASES.—(a). " Rust " or " soot " of young pigs (an eczematous condition characterized by the formation of black crusts). (b). " Nutritional eczema " and eczema following the use of certain drugs. Numerous foodstuffs have been incriminated, *viz*, fish meal, milk, rice, potatoes, malt, grape skins, vine leaves, sesame, linseed, white mustard, hops, molasses, maize, buckwheat, clover, lucerne and sugar beet. (c). Laminitis of horses and cows : in this condition the " allergen " may be either a foodstuff, a " toxin " from an inflamed uterus, or a drug. (d). Urticaria or nettlerash, and Quincke's oedema : these are well known, and can be caused by a wide variety of " allergens " ; horses are most commonly affected, and the condition is quite frequently observed in cattle and swine. (e). Purpura : this can be caused by many " allergens ", and is usually a complication of severe infectious illness [sweetclover disease has been overlooked].

B. Allergic Eye Diseases.—Four such diseases are described :– " summer harvest conjunctivitis and keratitis " of horses, usually ascribed to direct injury by hay seeds, etc. ; periodic ophthalmia of horses ; sexual recurrent ophthalmia of mares, and periodic ophthalmia of piebald cattle.

C. Metabolic Diseases.—(a). Dyscrasias occurring in connexion with parturition and lactation. S. suggests that the group of diseases represented by milk fever, lactation tetany, puerperal eclampsia and allied conditions which occur in all the domestic mammals, have a genetical factor in their aetiology, though there is as yet little collected evidence to support this view. (b). Myoglobinuria and haemoglobinuria in horses and cattle.

D. Broken Wind in Horses.—It is suggested that there may be a hereditary predisposition which takes the form of imperfect elastic tissue in the lungs, or of an asthmatic tendency.—J. E.

Weidlich, N. (1937). Ueber Tierseuchen in Karpathenrussland. [**Animal Diseases in the Carpathians (Ruthenia)**].—*Prag. tierärztl. Arch.* **17.** 219-227. 3 tables. [13 refs.]

A brief account of the population, climate, and soil, and of the methods of animal husbandry employed, is followed by an account of the infectious diseases of animals in the Carpathians. During the years 1932-1936, annual losses from anthrax diminished from 514 to 140. This is attributed mainly to the introduction of vaccination with glucoside culture in place of the various modifications of Pasteur's method previously employed. Losses from blackleg have similarly diminished since the introduction in 1925 of large-scale preventive inoculation.

During the years 1927 and 1928, an epidemic of fascioliasis in sheep occurred with losses estimated at 20,000 head. Glanders has not appeared since 1929, when two cases were reported. The number of recorded cases of swine erysipelas has recently increased, due probably, according to W., to the introduction from the western districts of Czechoslovakia of animals which are more susceptible. Preventive inoculation is not used owing it is said to the danger of transmitting swine fever with immune serum.

S.F. appears to be a very serious disease in the Carpathians, the number of cases reported annually since 1921 varying from 150 to 7,498. Owing to the conditions under which dogs are allowed to wander, outbreaks of rabies are not uncommon ; during 1936 there were 50 recorded cases in dogs, and ten in cattle.

The inhabitants pay little attention to diseases of the small domestic animals and birds, and accurate data relating to them are not available. Fowl cholera is wide-spread.

In general, infectious diseases on the free range (Weideseuche) are of greatest importance, whereas conditions such as tuberculosis, contagious abortion and metabolic disorders are as yet relatively rare. It is suggested that the introduction of intensive methods of agriculture may well ultimately bring about the state of affairs now existing in the western areas of Czechoslovakia.—E. G. White.

Gambles, R. M. (1938). **Disease of Cattle, with Special Reference to Cyprus.** —*Cyprus (agric.) J.* **33.** 43-48.

This article consists of a few short notes on the cause, symptoms, treatment, etc., of the commoner cattle diseases, from certain of the more important of which Cyprus is free. The comparatively small number of cattle in the Colony are said to be free from tuberculosis, Johne's disease, haemorrhagic septicaemia, contagious abortion, rinderpest, foot and mouth disease and contagious bovine pleuro-pneumonia ; blackleg is becoming rare, and anthrax is mainly confined to goats.

—F. J. Andrews.

TABUSSO, M. E. (1937). Apuntes de epizootiología Peruana. [**Animal Diseases of Peru**]. pp. 26. Lima : Instituto de Altos Estudios Agrícolas del Perú. [8vo]. [Also appeared in *Rev. zootec.* **25.** 26-39].

This booklet was published by the Institute of Microbiology, Sera and Vaccines, Lima. It divides Peru into coastal and mountainous regions. The common diseases of the coast are streptococcal mastitis, strangles, anthrax, tuberculosis, haemorrhagic septicaemia, brucellosis, anaerobic infections, piroplasmoses, foot and mouth disease, equine encephalomyelitis, swine fever and helminthiases. In the mountain region the following diseases are encountered in addition to the first seven enumerated above :– caseous lymphadenitis, braxy, parasitic dermatitis, and enzootic paraplegia of lambs (renguera).

To combat the wide-spread anthrax of the coast, the institute employs " protein vaccines " and saponin vaccines. Arsenical dips are used to control tick infestation. BCG vaccination, if not completely effective, is in the opinion of the institute worth a greatly extended trial.

The infections of the mountain area are neither so serious nor so wide-spread as those of the coast. Blackleg occurs sporadically. Malignant oedema is now dealt with by the use of natural and artificial aggressins. Equine encephalomyelitis appeared in virulent form in 1931, since when its intensity and mortality rate have greatly diminished.

Helminthiasis is the greatest practical problem confronting veterinarians in Peru.

Enzootic paraplegia of lambs (renguera) was investigated by a commission (1933) ; the cause, however, is still unknown.

The establishment of a quarantine station is recommended.—J. A. PASFIELD.

KOWNATZKI, D. A. (1938). Beitrag zur Bekämpfung der Weissen und Roten Kükenruhr. [**Control of** *Salmonella pullorum* **Infection and Coccidiosis**].—*Tierärztl. Rdsch.* **44.** 89-91, and 108-110. [Numerous refs.]

K. states that a dead *pullorum* vaccine (prepared by the Bacteriological and Serological Institute at Landesberg), is of value in the control of pullorum disease. It is harmless to hens and chicks and is said to give good results on properly managed poultry farms.

Normal horse serum is said to be useful in the treatment of chicks for coccidiosis (dose 1 c.c.)—SASSENHOFF (MUNICH).

I. BEVERIDGE, W. I. B. (1938). **Foot-Rot in Sheep : A Preliminary Note on the Probable Causal Agent.**—*J. Coun. sci. industr. Res. Aust.* **11.** 1-3.

II. BEVERIDGE, W. I. B. (1938). **Investigations on the Viability of the Contagium of Foot-Rot in Sheep.**—*Ibid.* 4-13. 2 tables.

III. BEVERIDGE, W. I. B. (1938). **The Control of Foot-Rot in Sheep.**—*Ibid.* 14-20. [3 refs.]

I. Having thoroughly investigated the possibility that foot-rot of sheep might be due to *Fusiformis necrophorus*, to the spirochaete *Sp. penortha*, or to a fusiforum organism commonly present in the lesion, B. concluded that none of these organisms was primarily responsible. He subsequently isolated a Gram-negative, anaerobic, serophilic organism, which he designated " K ", and by applying pure cultures of it to the scarified feet of sheep he was able to induce typical foot-rot lesions with regularity. He believes that *F.n.*, *Sp.p.*, and the fusiform organism referred to above may play a part in the accentuation or continuation of lesions induced by " K ".

II. This deals with the survival of the contagium of ovine foot-rot (a) apart from the sheep, and (b) in association with the sheep's foot. Under the most favourable conditions that could be devised, material from foot-rot lesions only remained infective for a few days when removed from the animal's foot. On the other hand, the infection will persist for years in an affected foot and can survive in pockets under the horn of apparently cured feet for many months. In addition, a superficial dermatitis of the interdigital space occasionally persists for some months in affected sheep, although the actual foot-rot lesions have been cured. The infective agent survives in these mild skin lesions unless they are subjected to treatment.

III. Methods of control, with the object of eliminating foot-rot, are here discussed. Since foot-rot is due to a specific infection which does not appear capable of surviving more than a very short period away from the sheep's foot, it should be possible to eradicate it. The whole matter is fully discussed in the light of laboratory and field experience. Results already obtained in Australia by the application of this knowledge to the control and eradication of the disease in the field are briefly mentioned. Field trials are still under way.

These are important contributions and should be read in full by all who are interested in this disease. B's work bids fair to place foot-rot among those diseases which can be eradicated with relative ease.—D. A. Gill.

Behrens, H. (1937). Untersuchungen über seuchenhaftes Verlammen in Schleswig-Holstein. [**Abortion of Sheep in Schleswig-Holstein**].—*Inaug. Diss., Hanover.* pp. 29. [Numerous refs.]

Sheep abortion is common in Schleswig-Holstein. B. could find no species of bacteria in aborted foetuses to which the condition might be attributed. He made estimations of the albumin : globulin ratio on 68 blood samples from five different sheep farms, on which abortion was prevalent, as part of an enquiry to ascertain whether dietetic error might be involved ; it was abnormal in 44, and " doubtful " in four. There was degeneration of the heart muscle of aborted foetuses.

The author believed that the condition was due to defective nutrition of the sheep during gestation ; in central and east Holstein the available fodder is poor in quality and lacking in vitamins, and on the west coast the ewes during the last few weeks of pregnancy are allowed to graze in cabbage fields.

Mostarda, G. (1937). Su di una enzoozia di mastite gangrenosa della pecora. [**Enzootic Gangrenous Mastitis in Sheep**].—*Clin. vet., Milano.* **60.** 37-41.

A clinical account of an outbreak.—S. F. J. Hodgman.

Brintrup, A. (1937). Ueber Gelenkentzündungen bei ausgewachsenen Schweinen. [**Arthritis in Adult Pigs**].—*Inaug. Diss., Hanover.* pp. 33. 4 figs. [11 refs.]

Of 4,892 pigs examined clinically and after slaughter at the Münster abattoir, 70 were found to be affected with arthritis. The joints of the hind legs were more frequently involved than those of the fore-legs.

Erysipelothrix rhusiopathiae was recovered from seven cases, and tubercle bacilli from one case. In one animal, trauma was considered to be the cause, and in two others the arthritis was associated with osteodystrophia fibrosa. The remaining cases yielded various organisms on culture—mainly staphylococci and streptococci—except for four from which no bacteria could be isolated. In the affected joints there was an increase in synovial fluid, which was usually blood-tinged, and the local lymph nodes were enlarged.—E. G. White.

BAUMANN, R. (1938). Zur pathologischen Anatomie der ansteckenden Lungenbrustfellentzündung der Angoraziegen. [**Pathology of Infectious Pleuro-Pneumonia in Angora Goats**].—*Arch. wiss. prakt. Tierheilk.* **73.** 285-294. 9 figs. [Numerous refs.]

This disease was first described in Algiers in 1873 and has since been recorded in Germany, Italy and in various parts of Africa and Asia Minor. In 1920 it was introduced into Greece from Asia Minor and eventually reached Bulgaria. It occurred in Germany, but has not been recorded there since 1918. A detailed description of the pathological anatomy is given from B's experience of an outbreak in Anatolia (Asia Minor) during 1936-1937.

The disease occurs only in mountainous country and appears to be favoured by large variations between day and night temperatures. The cause is considered to be a filtrable virus.

The lesions begin as peribronchial pneumonic foci, which, when superficial, are covered by a local fibrinous pleuritis. There is usually a serous pleural effusion. Necrosis and softening of the pneumonic areas commonly follows, distension of the interlobular septa with fibrinous exudate and an appearance similar to that seen in contagious bovine pleuro-pneumonia, but sequestra are not formed. There is frequently a diphtheritic rhinitis. Histologically, foci of perivascular and peribronchial organization as in contagious bovine pleuro-pneumonia are commonly found. In advanced cases, a variety of bacteria can be isolated, especially pasteurella, and it is said that in Turkey the disease is incorrectly diagnosed as pasteurellosis. [The disease closely resembles that seen in Palestine—see *V. B.* **7.** 603].
—E. G. WHITE.

DIETER, R. (1938). Ueber kongenitale Lungenveränderungen. I. Mitteilung. Kongenitale Bronchiektasie beim Kalbe. II. Mitteilung. Kongenitales Lungenödem beim Ziegenlamm. III. Mitteilung. Multiple Hämangiome in der Lunge eines Rehes. [**On Congenital Lung Changes. I. Congenital Bronchiectasis in a Calf. II. Congenital Pulmonary Oedema in a Kid. III. Hemangiomatosis of the Lung in a Roe Buck**].—*Arch. wiss. prakt. Tierheilk.* **73.** 218-231. 3 figs. [Numerous refs.]

I. A depressed area approximately 7 cm. in diameter was found on the pleural surface of the main lobe of the left lung in an otherwise normal calf. The underlying tissue consisted of a mass of cysts and ramifying ducts which had the histological structure of bronchioles. No alveoli were present in this area. This is believed to be the first authentic record of congenital bronchiectasis in animals.

II. In a stillborn kid the lungs were found to be several times the normal size, completely filling the thorax. There were 250 c.c. of a clear pleural effusion. Histologically, the bronchioles and interstitial tissue spaces were filled with fluid. The respiratory tree consisted only of bronchioles and alveolar ducts, no alveoli having been formed, probably due to the obstruction to their outgrowth from the alveolar ducts by the pressure of the fluid.

III. The lungs of a deer were studded with bluish-black nodules 2-5 mm. in size. Histologically, they were found to be multiple cavernous haemangiomata. This is the first record of this condition in deer.

In each of the above cases a review of the literature is given.—E. G. WHITE.

KRAUTER, A. W. (1938). Glomerulonephritis bei Hund und Katze. [**Glomerulonephritis in the Dog and Cat**].—*Arch. wiss. prakt. Tierheilk.* **73.** 205-217. 7 figs. [Numerous refs.]

Glomerulonephritis has usually been considered a rare condition in the dog

and cat. K. has, however, described 20 cases in each of these species encountered in the course of a year at the Institute of Veterinary Pathology at Munich.

In the dog, a diagnosis of glomerulonephritis on macroscopic examination of the kidneys is difficult, and histological examination is necessary. Acute, subacute and chronic forms are met with ; and the condition appears to be independent of both breed and sex, and is more common in old animals. In the cat, the condition is usually associated with infectious laryngitis and enteritis, and no example of the chronic type was found.

Histologically, the changes resembled those found in glomerulonephritis in man, *viz*, increase in glomerular tuft nuclei, formation of an exudate within the capsular space, and proliferation of the capsule epithelium, followed in chronic cases by marked fibrosis and hyalinization. In contrast to the condition in man, neutrophile infiltration during the acute stage was very scanty. Secondary degenerative changes in the tubule epithelium were common and were accompanied in chronic cases by interstitial fibrosis and lymphocytic infiltration.—E. G. White.

Stubbs, E. L., & Murphy, J. M. (1938). **Studies of Recurrent Ophthalmia of Horses.**—*Vet. Ext. Quart. Univ. Pa.* **38.** No. 71. 5-18. 4 tables.

" Eye material " from a case of recurrent ophthalmia was preserved by desiccation and by refrigeration for a period of three and a half months, when it was inoculated into the vitreous humour of 17 horses. Ten of these developed a condition that could not be differentiated from the naturally-occurring disease.

Two natural cases were studied over a period of several months, and attempts were made to transmit the condition, 19 horses being inoculated with filtered eye material. Three developed the disease. Attempts were also made to transmit the disease from a supposedly resistant horse to 14 others by the intra-ocular inoculation of blood serum. One developed a reaction similar to that of the natural disease.

The results are confused by the fact that the experimental horses were all old, and had various defects.—A. Wilson Taylor.

Parnes, J. (1938). Ein Beitrag zur Frage der Keratitis infektiosa bei Rindern. **[Infectious Keratitis in Cattle].**—*Tierärztl. Rdsch.* **44.** 388.

An infectious keratitis of cattle similar to periodic ophthalmia in horses is described, characterized by an acute catarrhal inflammation of the eyes and conjunctivae, and sometimes leading to damage of the internal structures of the eye. It usually spreads rapidly throughout the herd. Curative treatment is discussed.
—P. S. Watts.

Imai, Y., & Moriwaki, D. (1936). **A Probable Case of Cytoplasmic Inheritance in Man : A Critique of Leber's Disease.**—*J. Genet.* **33.** 163-167. [10 refs.]

A short review of the literature on Leber's disease (hereditary optic nerve atrophy) in man. The authors conclude that it is passed on by the female, according to Lossen's law. [It is possible that this condition occurs in calves, apart from that type of blindness which is due to avitaminosis-A ; see *V. B.* **8.** 724].—J. E.

NUTRITION IN RELATION TO DISEASE

Theiler, A., du Toit, P. J., & Malan, A. I. (1937). **Studies in Mineral Metabolism XXXVIII. Calcium and Phosphorus in the Nutrition of Growing Pigs.**—*Onderstepoort J. vet. Sci.* **9.** 127-164. 11 figs., 16 tables. [7 refs.] [See also *V. B.* **9.** 267].

The effect on young growing pigs of P or Ca deficiency or both was studied. Observations were made on body weight, food consumption, blood analysis and the physical, chemical and histological examination of the bones.

It was found that 0·8 g. P daily and 0·1% P in the ration were not only insufficient for normal growth and development, but were also the cause of marked lesions of rickets in the bones. Vitamin D was present in abundance. The usual low inorganic P content of the blood was observed while the serum phosphatase was considerably higher than that of normal pigs. Clinical symptoms of P deficiency appeared shortly after the beginning of the experiment and became extremely pronounced towards its conclusion approximately six months afterwards.

One gramme of Ca daily and 0·1% Ca in the ration were found to be insufficient for normal growth. The presence or absence of light appeared to be without effect and the ration probably contained enough vitamin D. Rickets did not develop at any stage of the experiment as judged from the microscopical examination of rib sections removed under anaesthesia. Bone atrophy or osteoporosis was present and also in one case incipient osteodystrophia fibrosa. The belief is expressed that Ca deficiency alone, will not produce rickets in pigs but might produce osteodystrophia fibrosa, and further work is being done along these lines.

When the ratio of Ca to P was normal and both minerals were present in deficient amounts, the detrimental effect of the deficiencies was by no means as severe as when one was present in insufficient and the other in excessive amounts —*i.e.*, in a wide ratio.

The effects of the deficiencies were more severe in the absence than in the presence of light. Microscopically the rib sections of the pigs showed marked bone atrophy and in two cases incipient rickets. The suggestion is made that the deficiency of P and Ca was not acute enough or that the experiment was not conducted for a sufficiently long period to produce rickets or osteodystrophia fibrosa or both.

Rations containing sufficient Ca and P, *e.g.* 6 g. Ca and 8·2 g. P or 13 g. Ca and 3 g. P witn abnormal ratio of Ca to P, produced no effect as compared with the normal group of pigs.

Ratios whose " Erdalkali-alkalizität " ranged from 6·5 mg. equivalents ot 62 mg. equivalents were fed for 120 days to eleven-week-old pigs. Sufficient Ca and P were present for normal growth. The pigs grew normally, remained healthy and neither rickets nor osteodystrophia fibrosa developed as might be anticipated from Marek's work. It is suggested that in presence of vitamin D the " Erdalkali-alkalizität " of a ration when sufficient Ca and P are present does not provide an adequate basis for explaining the development of osteodystrophic diseases in pigs.

GROENEWALD, J. W. (1937). **Osteofibrosis in Equines.**—*Onderstepoort J. vet. Sci.* **9.** 601-620. 24 figs., 4 tables, 3 appendixes. [11 refs.]

Clinical symptoms of osteofibrosis were noted, and later the existence of the condition was proved by histological bone examination, in 3 two-year-old fillies on a ration which daily contained 4·5 g. CaO and 54·29 g. P_2O_5 in the case of two, and 28·42 g. P_2O_5 in the case of the third. G. is of the opinion that considerable confusion exists regarding the nomenclature of this disease, with the result that it is frequently described as osteomalacia. From the data available, it would appear that blood Ca determinations are of little value for diagnostic purposes in cases of suspected osteofibrosis. Facial enlargements, when once established by the disease, were not reduced in size by feeding a ration which was supplemented with $CaCO_3$.

WAGMAN, I. H., & GULLBERG, J. E. (1938). **Effect of Vitamin A Deficiency upon Rate of Pupil Dilation during Dark Adaptation.**—*Proc. Soc. exp. Biol., N.Y.* **38.** 613-615. [6 refs.]

Nine rabbits from six to eight weeks of age were put on a vitamin A-free diet for 92 days, during which time weight records and dark adaptation tests for each animal were obtained. A series of photographic measurements were taken to determine the pupil dilatation during dark adaptation on each animal before it was placed on the restricted diet; subsequent measurements were taken every week. An analysis of all the data, from the pre-deficient series to the clear-cut terminal stages when physical lesions of vitamin A-deficiency were observed, showed that there was no significant difference in the rate of response at any point in the series. All the curves of the rate of pupil change during light and dark adaptation showed the form characteristic of normal animals.—R. ALLCROFT.

HECHT, S., & MANDELBAUM, J. (1938). **Rod-Cone Dark Adaptation and Vitamin A.**—*Science.* **88.** 219-221. 2 figs. [8 refs.]

In a study of the relative importance of the rods and cones of the retina in colour vision and an investigation of the influence of vitamin A-deficiency on both rods and cones, the authors studied the dark adaptation function of four normal young men, who were first put on an adequate diet and then on one deficient in vitamin A. Using the adaptometer of HECHT and SCHLAER [(1938). *J. opt. Soc. Amer.* **28.** 269.], it was found that the latter diet resulted in defective colour vision affecting rods and cones equally.—J. E.

WOOLLEY, D. W., STRONG, F. M., MADDEN, R. J., & ELVEHJEM, C. A. (1938). **Anti-Black Tongue Activity of Various Pyridine Derivatives.**—*J. biol. Chem.* **124.** 715-723. 1 fig., 1 table. [19 refs.]

A number of pyridine derivatives were tested for their effectiveness in the treatment of dogs affected with blacktongue. The results indicate that a highly specific molecular structure is required for anti-blacktongue potency. Considerable information was also obtained regarding the ability of the animal organism to carry out certain chemical transformations. A table is given summarizing the biological assays of the various compounds tested.—R. ALLCROFT.

FRASER, A. H. H., GODDEN, W., SNOOK, L. C., & THOMSON, W. (1938). **The Influence of Diet upon Ketonaemia in Pregnant Ewes.**—*J. Physiol.* **94.** 346-357. 4 figs., 3 tables. [Numerous refs.]

With 90 mated ewes divided into six groups of 15, kept in confinement, an attempt was made to produce ketonaemia experimentally, by over-feeding and by protein deficiency. The results did not confirm some commonly held views, such as that pregnancy disease is caused by over-fatness, lack of exercise, or protein deficiency.

The caloric value of the diet was found to be inversely correlated with frequency of occurrence and severity of ketonaemia, and the ketonaemia produced by under-nutrition was more frequent and severe in multiple than in single pregnancies. Some of the symptoms and pathological changes generally considered as characteristic of pregnancy disease were observed in undernourished or fasted pregnant ewes.—R. ALLCROFT.

GIROUD, P., & GIROUD, A. (1938). Régimes insuffisamment vitaminés et microbes de sortie; morbidité et mortalité en fonction du régime. [**Vitamin-Deficient Diets and "Microbes de Sortie"; Morbidity and Mortality as a**

Function of the Diet].—*C. R. Soc. Biol. Paris.* **128.** 606-608. [4 refs.] [See also *V. B.* **8.** 594].

During a period of four years, observations were made on over 1,000 guinea pigs divided into two groups : one group received a diet deficient in vitamin C and consisting essentially of cereals, dry hay and beetroots ; the other group received the same diet supplemented with green cabbage leaves, which supplied an adequate intake of vitamin C. After infection with " microbes de sortie " of NICOLLE (saprophytic organisms which become pathogenic when the host's natural resistance is overcome), and after submission to the same spontaneous infections, the vitamin C-deficient group had a much greater mortality. From these observations it is concluded that when a certain degree of vitamin C-deficiency exists, the resistance of the body is lowered so that it is much more susceptible to bacterial infection.
—R. ALLCROFT.

WEITZENBERG, R. (1938). Experimenteller Beitrag zur Bedeutung und über das Verhalten des Vitamin C bei bakteriellen Infektionen. [**Significance and Behaviour of Vitamin C in Bacterial Infections**].—*Arch. wiss. prakt. Tierheilk.* **73.** 188-204. 5 figs., 3 tables. [Numerous refs.]

In the course of an experiment that was continued for 70 days, W. claims to have shown that g. pigs fed a diet rich in vitamin C were considerably more resistant to artificially administered bacterial infection than were controls fed a diet poor in this respect. Resistance in this case was measured by infecting all animals with *Pasteurella lepiseptica* and then noting the duration of life of the animals in the vitamin-rich and vitamin-poor groups. As a control of the efficiency of the actual vitamin feeding, the tissues of all animals were tested P.M. for vitamin content.

In a subsequent section of the investigation it was shown that the administration of suprarenal gland extract alone or in conjunction with vitamin C had no influence upon the course of infection, nor did it have any significant influence upon the degree of storage of vitamin in the tissues.—E. J. PULLINGER.

PUBLIC HEALTH

EHRLICH, C. (1938). Tierarzt und Milchwirtschaft. [**The Veterinarian and Milk Control in Germany**].—*Dtsch. Tierärztebl.* **5.** 2-6.

Existing legislation in Germany has not provided for adequate veterinary control over the milk supply, except in the case of certain special grades of milk, and much untreated, infected raw milk, is sold to the consumer. Over large areas there is as yet no pasteurization. E. emphasizes the need for a system of strict and universal veterinary supervision of milk-production, the final aim being to prevent the entry into the market of any raw milk that does not come from herds entirely free from contagious abortion and tuberculosis.

The opposition to veterinary supervision from milk-producers who regard it as a nuisance and as a financial burden should be met by fixing statutory hygienic requirements with which the producer can easily comply, and by making the State responsible for the cost of supervision.—D. H. WILLSON.

CAPODAGLIO, A. (1937). I tempi d'azione della corrente elettrica nella mattazione dei suini e le conseguenti alterazioni da riflessi vascolari. [**The Mechanism of Electrical Stunning of Pigs**].—*Clin. vet., Milano.* **60.** 639-641. 1 table. [2 refs.]

Tong electrodes using a current of 70 volts and 0·5 ampères were used for

stunning pigs. Ecchymoses of varying size were found on the pleura and lungs of the pigs, principally on the lower left parts. By varying the duration of application of the electric current to pigs of 14-18 months and 130-140 kg. which had been starved for 16 hours, it was proved that with an average stunning time of about 20 seconds the development of the ecchymoses is minimized. Age, breed and an individual sensibility to the current are of importance.

—HANS GRAF (ZÜRICH).

THERAPEUTICS

JENSEN, Elsa. (1938). **Comparative Bacteriological Assay of some Phenylmercuric Compounds, including Merfen.**—*Acta path. microbiol. scand.* Suppl. No. 37. pp. 247-258. 4 tables. [2 refs.] [In English].

There is not a particularly great difference in the growth-inhibiting power and the germicidal action in 24 hours of the various phenyl mercuric compounds tested; there is, in particular, close agreement between the action of phenyl mercuric acetate, phenyl mercuric acetate plus borax, and merfen alone. With the exception of thiosulphates, all the phenyl mercuric compounds tested were able to sterilize the back of the hand in 1½ minutes in 2% glycerin solutions.

—J. M. ROBSON.

BOHLMAN, H. (1937). **Gas Gangrene Treated with Sulfanilamide. Report of Three Cases.**—*J. Amer. med. Ass.* **109.** 254-256. [13 refs.]

Three cases of gas gangrene were treated with sulphanilamide, and there was marked clinical improvement within 24 hours. The results in all three cases were very satisfactory. Sulphanilamide probably had a specific effect on the causal bacilli, but the result may in part have been due to checking symbiotic growth with the streptococcus.—J. M. ROBSON.

I. HOARE, E. D. (1938). **Bactericidal Changes Induced in Human Blood and Serum by Sulphamido-Chrysoidine and Sulphanilamide.**—*Lancet.* **234.** 655-659. 13 tables. [14 refs.]

II. WHITBY, L. E. H. (1938). **Chemotherapy of Pneumococcal and Other Infections, with 2-(*p*-Aminobenzenesulphonamido) Pyridine.**—*Ibid.* 1210-1212. 4 tables. [Numerous refs.]

III. FLEMING, A. (1938). **The Antibacterial Action in vitro of 2-(*p*-Aminobenzenesulphonamido) Pyridine on Pneumococci and Streptococci.**—*Ibid.* **235.** 74-78. 3 figs., 6 tables. [3 refs.]

IV. SPRAY, R. S. (1938). **Bacteriostatic Action of Prontosil Soluble, Sulfanilamide, and Disulfanilamide on the Sporulating Anaerobes Commonly Causally Associated with Gaseous Gangrene.**—*J. Lab. clin. Med.* **23.** 609-614. 3 tables. [2 refs.]

V. CHINN, B. D. (1938). ***In vitro* and *in vivo* Effect of Sulfanilamide on *Brucella abortus* and *Brucella suis*.**—*Proc. Soc. exp. Biol., N.Y.* **38.** 732-734.

I. A considerable bactericidal power against haemolytic streptococci was demonstrated in the blood of 12 patients treated with these drugs. No such bactericidal power was present in the blood of normal, untreated controls. In some cases bactericidal activity was present one hour after the first dose of sulphanilamide. Experiments are recorded which show that it is the serum containing free sulphanilamide which is primarily responsible for the killing power developed in the blood of patients receiving sulphanilamide.

II. The drug is chemotherapeutically active in experimental infections in mice against pneumococci of Types I, II, III, V, VII, and VIII, and especially so against Types I, VII and VIII. It appears to exert a definite action on the capsule of the pneumococcus. It is as active as sulphanilamide against the haemolytic streptococcus and meningococcus. It has a low toxicity for animals and does not produce porphyrinuria in those tested.

III. In concentrations which can probably be obtained therapeutically the drug retards the growth of streptococci in human blood ; in these concentrations it has a limited bactericidal effect. Blood containing the drug in such concentrations can, however, destroy a considerable number of streptococci, leucocytes being necessary for this destruction. If blood is rendered " immune " by the addition of some specific immune serum, the apparent effect of the chemical is enhanced. It is suggested that to obtain the best results with the drug, patients should be immunized actively or passively.

IV. These drugs exert an apparently specific selective action against *Cl. tetani*, " *Cl. lentoputrescens* ", *Cl. novyi*, *Cl. septique* and *Cl. histolyticum*. Little or no effect is exerted on *Cl. welchii*, *Cl. sporogenes*, *Cl. bifermentans* and *Cl. botulinum* in concentrations similar to those used therapeutically. The bacteriostatic activity increases in the order :– prontosil soluble, sulphanilamide, and disulphanilamide. The results of BOHLMAN [p. 339.] in the treatment of three cases of *Cl.w.* infection in man can only be explained on the assumption that the drug produces some secondary therapeutic action.

V. The drug produces a bactericidal and bacteriostatic effect on these organisms *in vitro*. Dilutions of 1 : 10,000 destroy most of the organisms within ten minutes. Dilutions of 10^{-6} produce a definite bacteriostatic effect. Similar effects have also been obtained with *Brucella melitensis*. G. pigs inoculated intra-abdominally with *Br. abortus* or *Br. suis* received 100 mg. of the drug *per os* daily, and this prevented development of a generalized infection.—J. M. ROBSON.

I. FINDLAY, G. M., & MACCALLUM, F. O. (1938). **Chemotherapy of Virus Diseases. [Correspondence].**—*Brit. med. J.* April 16th. 875.

II. OAKLEY, C. L. (1938). **Chemotherapy of Virus Infections.**—*Ibid.* April 23rd. 895-896. [2 refs.]

III. RHODES, A. J., & VAN ROOYEN, C. E. (1938). **Chemotherapy of Virus Diseases. [Correspondence].**—*Ibid.* 924.

I. The authors report negative results in the treatment with red prontosil of lymphocytic choriomeningitis, yellow fever and Rift Valley fever in monkeys and mice.

II. Five drugs of the sulphanilamide group were tested for curative properties on a total of about 400 mice infected with influenza virus. The results were all negative.

III. The authors found prontosil to be useless in the chemotherapy of poliomyelitis in monkeys and in rabbit myxomatosis.—J. M. ROBSON.

MOULIS. (1938). Essai de traitement des trypanosomiases animales par le sérum de cynocéphale. **[The Treatment of Animal Trypanosomiasis with Monkey Serum].**—*Bull. Serv. zootech. Epiz. A.O.F.* **1.** No. 3. 13-14.

A horse which showed no improvement when treated with novarsenobenzol, and a cow which had been treated with tartar emetic, but which later relapsed, were given an intravenous injection of 8-10 c.c. of serum from a healthy *Cynocephalus*. Both animals made an apparent recovery from trypanosomiasis. [The species of trypanosome concerned in the infections is not stated].—U. F. R.

ANON. (1938). Protection des plaies contre les mouches. **[Protection of Wounds from Flies].**—*Bull. Serv. zootech. Epiz. A.O.F.* **1.** No. 2. 65-66.

The two following prescriptions were found useful as fly repellents :– (a) 10 parts powdered naphthaline or quinine chloride, 20 parts alum and 100 parts plaster of Paris, and (b) 30 g. vaseline, 30 g. lanoline, 5 g. oil of juniper, 1·5 g. nitrobenzene, and 6 drops of formol.

STAMATIN, L. (1937). Le traitement de la gale par l'hyposulfite de sodium et l'acide chlorhydrique. **[Treatment of Mange by Sodium Hyposulphite and Hydrochloric Acid].**—*Arhiva vet.* **29.** No. 6. 12-15. [In French].

S. records the successful treatment of dogs, sheep, pigs and rabbits affected with acariasis. [The identity of the parasite responsible is not mentioned in connexion with any of the cases described]. After removal of the hair or wool, the affected areas were washed with warm water, and 60% sodium hyposulphite solution applied with a brush. When the areas had dried, a 10% solution of hydrochloric acid was applied in the same manner. In all cases the lesions healed in a day or two, and the animals remained healthy during the subsequent period of observation, which was usually two months.—J. MACLEOD.

MARTINI, I. (1937). Attualità terapeutiche in medicina veterinaria ; l'olio di chaulmoogra nella cura della rogna dermodectica. **[Treatment of Demodectic Mange with Chaulmoogra Oil].**—*Clin. vet., Milano.* **60.** 715-718.

A bulldog and a fox terrier affected with extensive pustulous and desquamative demodectic mange were rubbed daily with a mixture of 10 parts chaulmoogra oil, 20 parts ether, and 15 parts each of 95% alcohol and of ether petrolatum. Regeneration of the skin and healing took place after some weeks.—HANS GRAF (ZÜRICH).

MONTGOMERIE, R. F. (1937). **Drugs of Value in the Treatment and Control of Liver-Rot of Sheep.**—*J. comp. Path.* **50.** 314-316.

Little specific treatment was attempted until the winter of 1920-1921 ; then, and in succeeding years, " danistol ", a proprietary extract of male fern, proved of value in the expulsion of mature flukes.

An investigation, commenced by M. in 1924, showed that liquid extract of male fern, although as effective as " danistol " in the expulsion of adult flukes, was equally ineffective in dealing with immature forms in the small bile ducts and the parenchyma of the liver. In the winter of 1925-1926, he found that carbon tetrachloride in doses as low as 0·5 c.c. destroyed all mature flukes, and that an increase in the dose increased the efficiency of the drug in the expulsion of the immature forms. Maturity of the flukes, as shown by the presence of fluke eggs in the faeces, took place 11 weeks after the feeding of cercariae. The drug in doses of 10 c.c. caused the expulsion of flukes as young as four weeks ; similarly, 5 c.c. of carbon tetrachloride caused the expulsion of flukes seven weeks old, and 3 c.c. the expulsion of eight-week-old flukes.

Tolerance of the drug varied : a dose of 1 c.c. was, generally speaking, non-toxic ; mountain sheep have been shown to tolerate as much as 50 c.c. without any ill effect. On the other hand, for reasons as yet unexplained, certain flocks, generally of in-lamb ewes in good condition, folded and/or hand-fed, have been shown to be intolerant of the drug in doses as low as 1 c.c.—L. E. HUGHES.

LEVINE, P. P. (1938). **Studies on the Control of the Poultry Cestode** *Davainea Proglottina* **(Dav.).**—*Cornell Vet.* **28.** 220-227. 1 table. [17 refs.]

Anthelmintic studies under controlled conditions were undertaken upon

chickens experimentally infested with *D.p.* The following drugs were administered :– kamala, " oleoresin aspidii ", rotenone, hexylresorcinol, santonin, a mixture of turpentine and liquid paraffin, pelletierine tannate, betanaphthol, carbon tetrachloride, tetrachlorethylene, arecoline hydrobromide, oil of chenopodium in liquid paraffin, areca nut and kamala, thymol, " Jen-Sal worm powder ", " iodine vermicide " (Merck), thymol nicotine tablets, kamala nicotine tablets, " rota caps ", and areca nut alone. In no instance was the treatment successful. Areca nut was the only drug which removed any scolices, but only two birds were tested. Additional experiments proved that neither 2% tobacco dust in the mash nor 1 : 500 copper sulphate in the drinking water prevented infestation of chickens.

Infested slugs survived a severe winter in the field and also eight days' experimental exposure at 3°-5°C. Exposure for 24 hours at –1°C., however, was lethal to slugs and cysticercoids.—D. D. Ogilvie.

Anon. (1938). **Sulfanilamide as a Treatment for Salmon Poisoning in Dogs.**——*N. Amer. Vet.* **19.** No. 9. 57-59. 1 table, 1 chart. [2 refs.]

Out of 43 cases of " salmon poisoning " in dogs, treated by sulfanilamide, 38 recovered. In over 90% of untreated cases the disease was fatal. The drug was administered orally, 7-12 days after ingestion of the parasitized fish, 1-3 grains per lb. body weight being given every 24 hours. Improvement was usually noted in 24-48 hours, but administration was continued for a number of days. No detrimental after-effects were noted. It is suggested that, as sulphanilamide has not yet been shown to have any effect on virus diseases, the causative agent of " salmon poisoning " does not fall within the filtrable virus group.—D. D. Ogilvie.

Pacini, A. J. (1938). **The " Saturation " Method for the Treatment of Breeding Failures with Wheat-Germ Oil.**—*J. Amer. vet. med. Ass.* **93.** 236-238. [8 refs.]

This method consists in feeding an initial dose of 4 oz. of wheat-germ oil to the animal. This is followed by a tablespoonful of wheat-germ oil every third day for 21 days ; thereafter the animal is given grain feed to which 4 oz. w.-g. o. has been added to each ton of feed. It is claimed that the method is effective in about 85% of cases of ovarian subfunction, as against 70% treated by parenteral injection. There is a short discussion on the factors present in w.-g.o. ; it is emphasized that it contains factors in addition to vitamin E.—N. J. Scorgie.

Langdon-Brown, W. (1938). **Organotherapy.**—*Brit. med. J.* Oct. 15th. 773-776. [19 refs.]

Organotherapy can be used :– (1) as substitution therapy, where there is glandular insufficiency ; (2) to provide pharmacological agents, *e.g.*, insulin in schizophrenia ; (3) to provide an antagonist to another hormone, *e.g.*, oestrogens to inhibit pituitary activity ; (4) to influence general metabolism ; (5) as an attempt to utilize antihormonal activity (has not been successful so far), and (6) empirically in a variety of conditions. The substances can be given orally, subcutaneously, intramuscularly, intravenously, nasally, rectally and cutaneously.—J M Robson.

POISONS AND POISONING

Briese, R. R., & Couch, J. F. (1938). **Preservation of Cyanogenetic Plants for Chemical Analysis.**—*J. agric. Res.* **57.** 81-107. 2 figs., 23 tables. [Numerous refs.]

Losses of HCN from fresh cyanogenetic plants vary from 13% to 83% in

1-6 days. Large losses may occur when plants are stored in water and chloroform, with and without addition of alcoholic KOH. Rapid loss of HCN occurs in both acid and alkaline solutions; in the latter case the loss may be due to destruction of HCN rather than to inhibition of cyanogenesis. The maximum potential yield of HCN cannot be relied upon to develop after preservation by alcohol. $HgCl_2$ in aqueous solution is an excellent preservative, plants being kept in a 1% solution for six months without loss of HCN. A temperature of 25°C. was found to be optimum for preservation. Heating with dilute acids converts large quantities of HCN into other compounds, an unavoidable error in determining HCN.

—ALFRED EDEN.

STEYN, D. G. (1938). **The Presence of Hydrocyanic Acid in Stock Feeds and Other Plants.**—*J.S. Afr. vet. med. Ass.* **9.** 60-64. [6 refs.]

Reference is made to several plants which are extensively used as stock feeds and which may, under certain conditions of soil and climate, produce HCN, *viz*, linseed cakes, sudan grass, kaffir corn and the pods of *Acacia giraffae*. In addition, lucerne and the creeping salt bush are mentioned. Specimens of stunted and wilted lucerne collected during a spell of hot weather were found to produce appreciable amounts of HCN. It was also found in wilted specimens of salt bush, but not in fresh specimens and probably exists in the plant as a cyanogenetic glucoside.

Acalypha indica, a plant belonging to the Euphorbiaceae was found to contain HCN. The blood of rabbits, which died after being dosed with the plant, was found to be chocolate brown, but methaemoglobin could not be demonstrated. No symptoms were produced when the HCN in the plant was removed.—E. M. R.

MATHEWS, F. P. (1938). **An Experimental Investigation of Lechuguilla Poisoning.**—*Arch. Path.* **25.** 661-683. 3 figs., 13 tables. [6 refs.] [Copied *verbatim* from *Brit. chem. Physiol. Abstr.* July, 1938. p. 609. Signed C. J. C. B.]

Oral administration of alcoholic and aq. extracts of *Agave lechuguilla*, in small doses, the feeding of the ripe fruit of buckwheat (*Fagopyrum esculentum*) and also the alcoholic extract of hulls of buckwheat, rendered guinea-pigs and rats (but not rabbits) sensitive to exposure to sunlight. Buckwheat middlings and the intraperitoneal injection of 0·001 g. of eosin also sensitized rats to sunlight. In each case the signs were erythema, pruritis, lacrymation, oedema of face and ears, exophthalmos, followed by superficial necrosis of the ears, opacity and ulceration of the cornea, and nervous disturbances. The primary change was degeneration of the cutaneous capillary endothelium followed by oedema; leucocytes and plasma cells were abundant in the oedematous areas. The greater part of the activating light for buckwheat and lechuguilla poisoning was absorbed by red, green, and blue filters but not by yellow and appeared to be located in the region of the Na lines. Reactions could not be caused in sensitized animals by exposure to either C or Hg arcs. Recovery was followed in rats and guinea-pigs by a non-sp. resistance (in which only erythema could be produced) which lasted for 10 weeks but could be maintained indefinitely by continual administration of the agent and exposure to light. In addition to the photodynamic agent, a substance was extracted from lechuguilla which gave reactions compatible with those of a saponin or mixture of saponins and was hepatoxic and nephrotoxic in rats and guinea-pigs; the serious losses of goats and sheep due to lechuguilla are attributed chiefly to the saponin and not to photosensitization.

RIMINGTON, C., QUIN, J. I., & ROETS, G. C. S. (1937). **Studies Upon the Photosensitisation of Animals in South Africa. X. The Icterogenic Factor in Geel-dikkop. Isolation of Active Principles from *Lippia rehmanni* Pears.** —*Onderstepoort J. vet. Sci.* **9.** 225-255. 17 figs., 6 tables. [6 refs.] [See also *V. B.* **8.** 50].

An improved method is described for the isolation of the icterogenic material from *L.r.* Pears (Verbenaceae). This takes advantage of the slight solubility of the sodium salt of the active material in solutions containing sodium ions. The active principle icterogenin given in a dose of 1·5 g. or more *per os* to a sheep causes bilirubinaemia within 24 hours, together with atony and stasis in the fore stomachs and large intestines. By the intravenous route it was very toxic, quantities of 1 mg. causing death with shock-like symptoms. In doses of 1 mg. icterogenin has a pronounced inhibitory effect on the isolated heart when added to the perfusion fluid. It is haemolytic *in vitro* in a concentration of 1 : 35,000. Examination of the root bark of *L.r.* shows that the highest concentration of icterogenin is present in this tissue. A quantitative experiment extending over a year shows that a translocation of icterogenin takes place from the leaves to the root bark in *Lippia* plants. The effect of growth, season, etc., on this mechanism has been studied in relation to geel-dikkop.—E. M. ROBINSON.

I. RIMINGTON, C., & ROETS, G. C. S. (1936). **Chemical Studies upon the Vermeerbos, *Geigeria Aspera* Harv. I. Isolation of a Bitter Principle " Geigerin ".**—*Onderstepoort J. vet. Sci.* **7.** 485-506. 4 figs. [7 refs.]

II. RIMINGTON, C., ROETS, G. C. S., & STEYN, D. G. (1936). **Chemical Studies upon the Vermeerbos, *Geigeria Aspera* Harv. II. Isolation of the Active Principle, " Vermeeric Acid ".**—*Ibid.* 507-520. 6 figs. [3 refs.]

I. There has been isolated from toxic consignments of *G.a.* Harv. a neutral lactonic bitter principle to which the name geigerin has been assigned. This substance, though not the true toxic principle would appear to be not altogether devoid of pharmacological properties. From results obtained in the work dealt with in this communication, it would appear that geigerin is closely related chemically to the active principle of the plant which causes " vermeersiekte ". Geigerin is a monolactone, and the corresponding acid, geigeric acid, has been prepared. It would appear from the literature that geigerin is in all probability identical with the substance extracted by THOMS from *Chrysanthemum cinerariaefolium* in 1891, and named by him pyrethrosin.

Preliminary pharmacological experiments upon rabbits, sheep and cats are reported.

II. The toxic principle of the vermeerbos, *G.a.* has been isolated. It is a dibasic acid $C_{18}H_{28}O_7$, and has been named vermeeric acid. On standing in the air, vermeeric acid gradually loses two molecules of water, forming the crystalline dilactone vermeerin $C_{18}H_{24}O_5$.

Vermeerin has M.P. 143°C. and $[\alpha]^{28}_{D} = -50{\cdot}51$°C., but vermeeric acid is optically inactive.

Both substances, like geigerin, give a colour reaction with hydrochloric acid, but the colour is browner, and in the case of vermeerin it is of very slight intensity. An absorption band at 546·5 $m\mu$ could be distinguished and, two other bands were faintly discernible.

Vermeeric acid forms a 2 : 4 dinitrophenylhydrazone soluble in sodium carbonate and re-precipitated by acids. This derivative appears to contain less H_2O than that expected upon the assumption of a simple reaction, and it is thought probable that closure of one lactone ring simultaneously occurs. Vermeerin when

treated with hot Brady's reagent reacts to such a slight extent that the absence of any ketonic or keto-enolic function is inferred in the undecomposed substance.

Vermeeric acid decolorizes potassium permanganate in the cold. By oxidation with this reagent in alkaline solution at the boiling temperature there was obtained an acid crystallizing in small prismatic needles, of M.P. 229-230°C. and another substance which when treated with cold dilute acid immediately liberated acetaldehyde, the 2 : 4 dinitrophenylhydrazone of which was prepared for identification.

Accompanying vermeeric acid in the plant were found two flavone-like substances, the one with M.P. 269-271°C. being, in all probability $C_{17}H_{12}O_6(CH_3O)_2$, the other, of M.P. 243-244°C., having the formula $C_{19}H_{18}O_7$ (methoxyl not determined).

Vermeeric acid drenched to sheep in doses of 10-15 g. caused death from acute " vermeersiekte " within 6-48 hours.

DERZELLE, E. (1938). Intoxication alimentaire du cheval par les vesces. [**Poisoning of Horses by Vetches**].—*Ann. Méd. vét.* **83.** 293-301.

A mare fed exclusively on fresh vetches for a month developed symptoms of haemoglobinuria and icterus. On changing the diet to oats and wilted vetches there was some recovery, although the animal remained weak. Six weeks later there was a recurrence of the condition, with similar symptoms and elevated temperature. Bacteria and piroplasms could not be incriminated as causal agents, but recovery occurred when all vetch feeding was stopped. Various possible causes of the condition are discussed, but it was concluded that the cause was vetch poisoning, and although there was no evidence of any specific constituent as the toxic factor, the tentative suggestion of HCN poisoning is put forward.—A. E.

PHYSIOLOGY

DE MOULIN, F. (1938). Iets over de huid van den buffel. [**The Skin of the Buffalo**].—*Ned.-ind. Bl. Diergeneesk.* **50.** 238-241.

The epidermis of the buffalo is only slightly thicker than that of cows, but the corium is much thicker. The number of glandulae ceruminosae is greater on the under side of the abdomen than on the back, and the number of blood-vessels there is also much greater. The skin arteries all have very thick walls, with abundant muscle fibre. These blood-vessels are surrounded by loose connective tissue, so that the vessels may expand.—JAC. JANSEN (UTRECHT).

RIDDLE, O., & CAUTHEN, G. E. (1938). **Erythrocyte Number in Young Pigeons and its Relation to Heredity, Growth and Metabolism.**—*Amer. J. Physiol.* **122.** 480-485. 1 fig., 1 table. [16 refs.]

The authors studied the fluctuations in red blood cell values in pigeons for 100 days after hatching. In the first three days after hatching, the number of red blood cells fell from 1,275,200 to 1,078,000 per c.mm. of blood. At about the 27th day of post-natal life the maximum value of 3,409,700 red blood cells was reached, and this was maintained for about 30 days. This reduction of red blood cells in early post-natal life has also been observed in rats, rabbits and human beings.

The red blood cell level is closely associated with growth capacity in the first three days. Only the early period (about one third) of red blood cell increase is associated with an increased basal metabolic rate. After the end of the third or fourth month the red blood cell level and the basal metabolic rate slowly diminish throughout life.—D. L. HUGHES.

FRASER, F. R. (1938). **The Clinical Aspects of the Transmission of the Effects of Nervous Impulses by Acetylcholine.**—*Brit. med. J.* June 11th. 1249-1254, June 18th. 1293-1299, and June 25th. 1349-1354. 13 figs. [Numerous refs.]

Acetylcholine is believed to transmit the nervous impulse from nerve endings to the effector organs in the following fibres :–

(1) The " muscarine " group ; all post-ganglionic para-sympathetic fibres, post-ganglionic sympathetic fibres to the sweat glands, sympathetic vaso-dilator fibres to the muscles, and antidromic impulses conveyed by sensory fibres to cutaneous vessels.

(2) The " nicotine " group ; all preganglionic fibres of the autonomic nervous system, motor nerves to skeletal muscle and the nerves to the adrenal medulla.

By intravenous injection, acetylcholine produces vasodilatation, sweating and typical parasympathetic effects ; its action is very brief, as it is rapidly hydrolysed by the choline esterase in the blood. By intramuscular or subcutaneous injection its action is more prolonged, but is very uncertain. Atropine inhibits most of the " muscarine " group of effects ; physostigmine potentiates its activity by inhibiting the esterase.

Carbaminoyl-choline and acetyl-β-methyl choline are more stable than acetylcholine and have very similar actions ; the first is dispensed in 1 c.c. ampoules containing 0·1 mg. or 0·25 mg. as lentin and doryl respectively ; the second is sold as mecholin. These drugs have a more pronounced and lasting effect on the gastro-intestinal tract and urinary bladder than has acetylcholine, while causing less disturbance to the cardio-vascular system. In man they are used in cases of post-operative gastro-intestinal atony and retention of urine. They have also been used successfully in cases of chronic glaucoma.

Prostigmin is the di-methyl-carbamine ester of 3-oxyphenyl-trimethyl-ammonium methyl sulphate, and has very similar actions to physostigmine except that it causes less disturbance to the cardio-vascular system ; for this reason it is preferred in human medicine to physostigmine in the treatment of gastro-intestinal atony.—A. T. PHILLIPSON.

FOLLEY, S. J. (1938). **The Rôle of the Anterior Pituitary in Lactation. A Review of Recent Work.**—*Lancet.* **235.** 389-390. [Numerous refs.]

When pregnant animals are hypophysectomized, the subsequent lactation does not appear, or is transient ; hypophysectomy also leads to a cessation of lactation actually in progress. Anterior pituitary extracts produce lactation. Prolactin (a purified anterior pituitary extract) produces growth of the crop gland of the pigeon, but not necessarily lactation in the mammal, though a crude anterior pituitary extract can do so. In addition to prolactin, adrenal cortex hormone or anterior pituitary adrenotropic hormone is necessary for lactation in hypophysectomized animals. The ability of anterior pituitary extracts to stimulate the secretion of normal milk is more closely correlated with their glycotropic (anti-insulin) activity than with pigeon crop-stimulating activity.—J. M. ROBSON.

I. CHRISTNACH. (1938). Ueber die neuesten Ergebnisse der Hormonforschung bei trächtigen Stuten und über eine darauf aufgebaute frühe Trachtigkeits-diagnose auf chemischem Wege. [**Recent Research on Hormones of Pregnant Mares and Chemical Pregnancy Diagnosis**].—*Z. Veterinärk.* **50.** 227-236. [14 refs.]

II. KRAUSS, F. (1938). Die Verwertbarkeit der Kustallowschen Reaktion zum Trächtigkeitsnachweis beim Rinde. [**Kustallow Pregnancy Diagnosis Method in Cattle**].—*Dtsch. tierärztl. Wschr.* **46.** 258-259. 3 tables. [4 refs.]

I. A short discussion is given on the hormones produced by the pituitary, ovaries, testes, etc. Cuboni's method of diagnosing pregnancy [*V. B.* **6.** 379.] was tested on 31 non-pregnant mares and ten pregnant mares to see if it could be applied quickly by a field worker. The method has proved reliable but, in C's opinion, is too complicated to be used in the field.

II. This test [see *V. B.* **9.** 189.] was applied to the urine of 15 pregnant and 10 non-pregnant cows. In all but one case the protozoa ceased to move in 0·5 to 2 minutes. In the one case in which movement persisted longer, the specific gravity was 1014, as opposed to 1030-1040 for the other animals. The urine was diluted to 1003 in all cases and the test reapplied, and in no case did the protozoa lose their activity. Solutions of gonadotropic and ovarian hormones had no effect on the movements of the protozoa. It is concluded that this test is not specific for ovarian hormone excreted in the urine, but that it depends upon the specific gravity of the urine and is consequently useless for the diagnosis of pregnancy in cattle.—A. T. PHILLIPSON.

ASIMOV, G. J., & KROUZE, N. K. (1937). **The Lactogenic Preparations from the Anterior Pituitary and the Increase of Milk Yield in Cows.**—*J. Dairy Sci.* **20.** 289-306. 5 figs., 10 tables. [Numerous refs.]

Experiments carried out on 600 cattle on a state farm in the U.S.S.R. showed that injection of a lactogenic preparation (a total extract of the anterior pituitary) produced a considerable increase in the milk yield for several days. The injections were most effective in well kept cows and during the first half of the lactation period. The quality of the milk remained normal and in some cases the percentage of butterfat was slightly increased. Tests carried out over a period of two or three years showed that the injections were quite harmless and had no undesirable after-effects on the productivity of the aninals.—R. ALLCROFT.

BRÜGGEMANN, J., & RATHSFELD, H. (1937). Beitrag zur chemischen Zusammensetzung des Analbeutelsekretes vom Hund. [**Chemical Composition of the Secretion of the Anal Sac in Dogs**].—*Hoppe-Seyl. Z.* **250.** 123-131.

The secretion from the anal glands of dogs was subjected to chemical analysis. It was found that such secretion consisted of about 85% water and 15% dry matter. The latter contained a small percentage of phosphates, but was composed largely of cholesterin and fat. The details of the analyses are recorded.—E. J. PULLINGER.

TECHNIQUE AND APPARATUS

I. NELSON, W. E., SEIBERT, Florence B., & LONG, E. R. (1937). **Technical Factors Affecting the Tuberculin Test.**—*J. Amer. med. Ass.* **108.** 2179-2181. 3 tables. [7 refs.]

II. ANON. (1937). **Adherence of Tuberculin to Syringes.**—*Brit. med. J.* Oct. 2nd. 670. [3 refs.]

I. The authors report false positive reactions to Schick tests on human beings, in which the error was traced to the fact that the syringe used for the injection had previously contained tuberculin and had not been freed from it by the usual rinsing, boiling and autoclaving procedure. They found by appropriate tests that false positive allergic reactions could occur when any parts of the apparatus

(glassware, etc.), used for holding the injection material, had previously contained old tuberculin or purified protein derivative (P.P.D.). They further found that traces of tuberculin were not removed from syringes either rinsed in 5% NaOH, immersed in 5% NaOH overnight, washed in water, or heated for ten minutes in sulphuric acid plus dichromate cleaning mixture, but that the traces were removed when the syringes were placed for 12 hours in H_2SO_4 plus dichromate, washed in water, and boiled in soap solution, or else boiled in soap solution and left for 12 hours in H_2SO_4 plus dichromate.

II. A note calling attention to I. [See also PARISH and O'BRIEN, *V. B.* **6.** 352].—J. E.

RISHWORTH, H. R. (1938). **Efficiency of Steam Sterilizers.**—*Brit. med. J.* Sept. 10th. 574-576. 2 figs., 2 tables. [5 refs.]

The use of the pressure gauge for inferential readings of temperature in sterilizers is deprecated, since residual air and lag in temperature rise are two fundamental causes of inefficiency in working. The Gravity Discharge System and the direct Internal Thermometer Control System for ensuring maximum efficiency in sterilizers are described, and their relative merits discussed.—R. A.

JENKE, M., & BANDOW, F. (1937). Ueber die Verwertbarkeit der Schwefelsäure-Fluorescenzreaktion der Gallensäuren im Blut, Stuhl und Harn. [**Use of the "Sulphuric Acid-Fluorescence" Reaction for Bile Acids in Blood, Faeces and Urine**].—*Hoppe-Seyl. Z.* **249.** 16-23.

It is concluded on the results of detailed experiments that the sulphuric-acid-fluorescence reaction is not reliable for use as a quantitative test for bile salts in blood, faeces or urine.—E. J. PULLINGER.

I. ZEILE, K., & RAU, B. (1937). Ueber die Verteilung von Porphyrinen zwischen Aether und Salzsäure und ihre Anwendung zur Trennung von Porphyringemischen. [**Separation of Porphyrins by Ether and Hydrochloric Acid, and its Use in the Breaking up of Porphyrin Mixtures**].—*Hoppe-Seyl. Z.* **250.** 197-217.

II. FISCHER, H., & HERRLE, K. (1938). Einwirkung von Licht auf Porphyrine. (I Mitteilung). Ueberführung von Aetio-porphyrin I in bilirubinoide Farbstoffe. [**Effect of Light on Porphyrin. Part I. Conversion of Aetio-Porphyrin I into Bilirubinoid Pigment**].—*Ibid.* **251.** 85-96.

I. Porphyrins may be separated into their component fractions, copro-, deutero- and protoporphyrin, by the use of ether and hydrochloric acid. Fractionation is governed by a law which can be expressed by a simple equation containing two given constants. This type of fractionation of porphyrins can be applied to the analysis of pathological faeces and of fossils.

II. A technical article dealing with the various steps in the conversion of aetio-porphyrin I into bilirubinoid pigment. Descriptions of the technique from the quantitative and qualitative points of view are given.—E. J. PULLINGER.

VAN NIEKERK, P. LE R. (1937). **Veterinary Biochemical Studies I. A Rapid Method for the Determination of Copper in Biological Material.**—*Onderstepoort J. vet. Sci.* **9.** 623-628. 3 tables. [6 refs.]

The author has modified the methods of MACFARLANE [(1932). *Biochem. J.* **26.** 1022.] and TOMPSETT [(1934). *Ibid.* **28.** 1544.], in order to overcome the interference caused by the iron present in some biological material, by reducing the amount of carbamate reagent generally used and accelerating the process of

combustion of the material through the introduction of an oxidizing agent (mixture of magnesium nitrate and carbonate). The combustion time is cut down by about one half, and at the same time the copper is rendered more easily soluble for subsequent extraction.—H. GRAF.

SHORTT, H. E., HAWLEY, H., & SWAMINATH, C. S. (1938). **Iron-Haematoxylin Staining Technique: an Illusion.**—*Indian J. med. Res.* **26.** 259-260. [1 ref.]

When using Heidenhein's method of staining protozoa by an aqueous solution of haematoxylin preceded by mordanting in an aqueous solution of iron-ammonium-alum, it has always been emphasized that crystals of iron-ammonium-alum showing no signs of decomposition should be used, *i.e.*, crystals with a good violet colour should be used in preference to crystals with a deposit of insoluble basic alum.

The authors found that solutions made up in 0·5% sulphuric acid were equally satisfactory in use and remained perfectly clear for several months at a room temperature of 85°F.

They conclude that the only essential factor in producing a good iron haematoxylin stain is a good solution of haematoxylin.

I. FLOSDORF, E. W., & MUDD, S. (1935). **Procedure and Apparatus for Preservation in "Lyophile" Form of Serum and Other Biological Substances.** —*J. Immunol.* **29.** 389-425. 11 figs., 2 tables. [Numerous refs.]

II. FLOSDORF, E. W., & MUDD, S. (1938). **An Improved Procedure and Apparatus for Preservation of Sera, Microörganisms and Other Substances—The Cryochem-Process.**—*Ibid.* **34.** 469-490. 6 figs. [Numerous refs.]

I. A procedure and apparatus for the preservation of sera, bacterial cultures, viruses and other labile biological material are described in detail. In principle, the method consists of freezing the material rapidly at a very low temperature, and rapid dehydration from the frozen state by means of a high vacuum. The resulting product can be sealed off under the original vacuum, preserved and stored for at least ten months, and can easily and completely be brought to its original state by the addition of distilled water, without any loss of the original potency or value. The freezing mixture employed is dry-ice (solid CO_2) dissolved in the methyl ether of ethylene glycol (methyl cellosolve), a temperature of –78°C. is maintained, and a pressure of less than 0·70 mm. Hg is required. Models are described for use in laboratories and hospitals and also those for production of the "lyophilic" serum on a semi-industrial and industrial scale. Full details of the apparatus and technique employed are available in the original, to which the reader is referred.

II. A further refinement of the technique for preserving sera and other substances in the dry state is described, involving a cheaper and more rapid process and leading to an improved product from the point of view of solubility and other characteristics. The principle consists in removal of water vapour by a specially prepared calcium sulphate ("drierite") which can be regenerated by heating to 150° or 200°C. at ordinary pressure. For serum, the product is degassed in a low vacuum, after which the dehydration takes place *in vacuo* in a special apparatus. The process can be accelerated by a preliminary freezing and the high vacuum required in the dry-ice process [see I, above] is not so necessary in the present case. Procedures for the desiccation of substances such as human milk, virus products and cultures are fully described, and the original should be consulted for full details of the apparatus and technique employed.—ALFRED EDEN.

BAUER, J. H., & PICKELS, E. G. (1937). **An Improved Air-Driven Type of Ultracentrifuge for Molecular Sedimentation.**—*J. exp. med.* **65.** 565-586. 13 figs. [Numerous refs.]

The authors give details of construction and operation of an improved type of air-driven ultracentrifuge operating in vacuum and suitable for the determination of sedimentation constants of protein molecules. The rotor has been run over long periods at a speed of 60,000 r.p.m., which corresponds to a centrifugal force of 260,000 times gravity in the centre of the cell. At this speed no deformation of the rotor, leakage of the cell, or vibrations in the centrifuge have been detected.

The adaptation of Svedberg's optical systems to this centrifuge for photographically recording the movement of sedimentation boundaries is described.
—R. ALLCROFT.

CHILES, J. A., Jr., & SEVERINGHAUS, A. E. (1938). **Hormone Studies with the Ultracentrifuge. I. An Improved Air-Driven Vacuum Ultracentrifuge Suitable for Concentration Work in Biological Experiments.**—*J. exp. Med.* **68.** 1-16. 7 figs. [2 refs.]

A detailed technical and structural description is given of an ultracentrifuge which holds ten test tubes and has a capacity of 55 c.c. : it is operated at a maximum speed of 51,000 r.p.m., which develops at the top of the fluid column in the test tubes a centrifugal field of over 100,000 times gravity.—R. ALLCROFT.

MISCELLANEOUS

—. (1938). **Second International Conference for the Protection of the Fauna and Flora of Africa : London, May, 1938. Final Act.** pp. 149. London : H.M. Stat. Off. [8vo] [2s. 6d.] [In English and French].

The deliberations were fundamentally of zoological interest, but the disease aspect was also considered. As part of the general agreed policy, exchanges of information on diseases and parasites of wild animals will in future be made between the participating nations.—J. E.

ANON. (1938). Texte de la loi adoptée par la Chambre des Députés. Séance du 28 janvier, 1938, J.O., 29 janvier, 1938. [**Text of a Law Regulating Veterinary Medicine, Adopted January, 1938**].—*Rev. Abatt.* **25.** 17-18.

This law restricts the practice of veterinary medicine, with certain exceptions, to French citizens who have the diploma of one of the French National Veterinary Colleges, or who hold the veterinary doctorate of the medical faculties of Paris, Lyons or Toulouse. The administrative and judicial authorities only recognize persons so qualified, who must register their names in their respective districts. A list of qualified practitioners is kept in each " département " and exhibited in each " commune ".

It is illegal for unqualified persons to practise animal medicine and surgery, whether for remuneration or not. Certain exceptions are laid down : the most notable is the permission to those already practising to continue doing so for the duration of their lives, subject to the inscription of their names in a special register.
—D. H. WILLSON.

STUTZKI, H. (1937). Die Geschichte und Entwicklung der deutschen tierärztlichen Zeitschriften. [**History of German Veterinary Periodicals**].—*Inaug. Diss., Berlin.* pp. 79. [Numerous refs.]

This is evidently a complete history of periodical veterinary literature of

Germany, Austria and Switzerland. A total of 110 publications is referred to, of which 90 were of German origin.

The publications are dealt with chronologically, beginning with the *Magazin für Vieharzneykunst*, which appeared in 1784, and ending with the *Deutsche Tierärzteblatt* of 1934. Brief histories of defunct periodicals are given, and longer accounts of those still published, together with particulars concerning the editor, publisher and price.

There is an alphabetical index to the periodicals reviewed.—J. E.

—. (1938). E. Merck's Jahresbericht über Neuerungen auf den Gebieten der Pharmakotherapie und Pharmazie. [**Merck's Yearbook**]. pp. 347. 26 figs, on 4 plates, 6 tables, 21 graphs. [Numerous refs.] Darmstadt: E. Merck. Chemische Fabrik. [8vo].

This contains seven general articles on medical chemotherapy, including one on the use of "vigantol" in veterinary medicine [see *V. B.* **9.** 275.], and also descriptions of numerous drugs manufactured by Merck.—J. E.

MOHLER, J. R. (1938). **Seventy-Five Years of Progress in Veterinary Medicine.** —*J. Amer. vet. med. Ass.* **93.** 98-104.

This is an address given at the 75th annual meeting of the American Veterinary Medical Association. There is a brief reference to such workers as PASTEUR, LISTER, etc., and the earlier American workers, followed by a very long list of the outstanding achievements of the past 75 years, comprising discoveries in connexion with the causation, diagnosis and treatment of disease, and methods for the eradication of various affections in the United States.

The rest of the address touches lightly on such subjects as :– co-ordination of work in various states for the control of contagious disease ; the influence of the aeroplane and other modern inventions on veterinary science and education ; the importance of improved methods of breeding and of research in nutrition and genetics for the improvement of stock, and the benefit of proper veterinary supervision of meat inspection and milk supply.—F. J. ANDREWS.

LETARD, E. (1938). Notes de voyage sur l'organisation de l'enseignement et des recherches vétérinaires, dans quelques pays étrangers. [**Notes on a Journey to Study Veterinary Organization, Education and Research in the U.S.S.R., Poland, and Czechoslovakia**].—*Rec. Méd. vét.* **114.** 273-281.

The article is an account of visits to various veterinary schools and research institutes in the countries named. A description of the accommodation, staffing and the type of work pursued is given. The veterinary schools at Leningrad, Moscow, Kharkov, Warsaw, Lwów and Brno were visited, and institutes at Moscow and in Ukraine (Kieff).—D. L. HUGHES.

GUENTHER, D. F. (1938). Erfahrungen über chinesische Landwirtschaft und Tierhaltung. [**Chinese Agriculture and Animal Husbandry**].—*Berl. Münch. tierärztl. Wschr.* July 22nd. 440-443, July 29th. 456-460, and August 5th. 472-476. 15 figs.

An account of general agriculture in North China during the years 1902-1909. A separate section is devoted to the general management and illnesses of each of the common domestic animals, *viz*, cattle, horses, sheep, camels, pigs and poultry, of which the fullest is the dealing with the Mongolian pony.—P. S. WATTS.

OFFICIAL AND OTHER REPORTS.

Extracts from Municipal Veterinary Reports, Great Britain and Northern Ireland.

1. Aberdeen. (City). (1938). **[Report of] Veterinary Services [1937].** [Howie, G.]—*Rep. med. Offr Hlth, Aberd., 1937.* pp. 60-64. 4 tables.
2. Belfast. (County Borough). (1937). **Report of the City Veterinarian for the County Borough of Belfast for the Year 1936.** [McLean, A.] pp. 10. 8 tables. Belfast: S. C. Allen & Co. Ltd. [fcp].
3. Bolton. (County Borough). (1938). **Annual Report of the Veterinary Officer [1937].** [Holmes, R. P.]—*Rep. med. Offr Hlth, Bolton, 1937.* pp. 65-80. Numerous tables.
4. Edinburgh. (City and Royal Burgh). (1938). **Annual Report of the Veterinary Department for the Year 1937.** [Gofton, A.] pp. 21. 6 tables. Edinburgh: Veterinary Dept. [8vo].
5. Glasgow. (City). (1936). **Annual Report of the Chief Veterinary Inspector for the Year 1935.** [Abbott, S. G.] pp. 19. 3 tables. Glasgow: Robert Anderson & Sons, Ltd. [8vo].
6. Glasgow. (City). (1937). **Annual Report of the Chief Veterinary Inspector for the Year 1936.** [Abbott, S. G.] pp. 18. 3 tables. [8vo].
7. Liverpool. (City). (1937). **[Report on] Food Inspection during 1936.** —*Rep. med. Offr Hlth, Liverpool, 1936.* pp. 225-266. Numerous tables.
8. Liverpool. (City). (1938). **[Report on] Food Inspection (1937).**—*Rep. med. Offr Hlth, Liverpool, 1937.* pp. 232-273. Numerous tables.
9. Liverpool. (City). (1938). **Report of the Chief Veterinary Officer for 1937.** [Matthews, H. T.] pp. 36. 6 tables. Liverpool: C. Tinling & Co., Ltd. [8vo].
10. Manchester. (City). (1938). **Report on Veterinary and Public Health Work, 1937.** [Locke, R. C.]—*Rep. Hlth City Manchr, 1937.* pp. 52-66. 9 tables.
11. Manchester. (City). (1938). **Report of the Markets Committee for the Year ending 31st March, 1938 [Food Inspection and Diseases of Animals].** [Johnstone, W. K.] pp. 27. 22 tables, 1 appendix. Manchester: Henry Blacklock & Co., Ltd. [8vo].
12. Newcastle-on-Tyne. (City and County). **Annual Report of the Veterinary Officer for the Year 1937.** [Thornton, H.] pp. 27. 18 tables. Newcastle-upon-Tyne: Christie, Malcolm, Ltd. [8vo].
13. Preston. (County Borough). (1938). **[Report on] Inspection and Supervision of Food [1937].** [Finch, R.]—*Rep. med. Offr Hlth, Preston, 1937.* pp. 54-73. 8 tables.
14. Salford. (City). (1937). **Report Relating to the Meat and Food Inspection, Milk Supply, and the Diseases of Animals Acts [1936].** [Alexander, A.] —*Rep. med. Offr Hlth Salford, 1936.* pp. 139-149. 2 tables.
15. Stoke-on-Trent. (City). (1938). **Annual Report of the Veterinary Officer, Stoke-on-Trent, 1937.** [Manley, F. H.] pp. 9. 2 tables. Stoke-on-Trent: Publ. Hlth Dep. [fcp] [Mimeographed].
16. West Ham. (County Borough). (1937). **Report of the Veterinary Officer for 1936.** [Bywater, H. E.]—*Rep. Hlth Serv. West Ham, 1936.* pp. 102-118. 8 tables.

	Milk Supply					
	Number of herds supplying milk					
	1	2	3	4	5	
	Certified	Grade A (T.T.)	Grade A (Accredited)	Ungraded	Pasteurized	Registered Herds/Shops
Aberdeen ...	14			1	53D	
Belfast ...						61
Bolton ...		2P 1D	11P		2D	120P 776
Edinburgh ...	1P			2P		54P
Glasgow (5) ...	2P			38P		40
Glasgow (6) ...				39P		39
Liverpool (7) ...	1P 8D	3P 34D	58P 57D		5P 20D	747
Liverpool (8) ...	1P 7D	2P 32D	64P 62D		5P 20D	713
Liverpool (9) ...		1P	67P			222
Manchester (10)		1P 51D	11P 20D		24D	56
Manchester (11)						
Newcastle ...		1P	7P			20P
Preston ...		7D	28D	249D	2P 4D	10P 111
Salford ...	16D	6D	1P 12D		38D	420P 772
Stoke-on-Trent		1P 41D	23P 8D		18D	146
West Ham ...	3D	11D	8D		20D	109P 649

NOTE. P = Producer, D = Dealer. Colur

ADDITIONAL NOTES.

1. ABERDEEN.—Veterinary staff—one. Abattoir and meat market statistics are given.
2. BELFAST.—Veterinary staff—one. Abattoir statistics are given.
3. BOLTON.—Veterinary staff—one. Abattoir statistics are given.
4. EDINBURGH.—Veterinary staff—four. The report includes abattoir statistics, and figure for imported food rejected at the Port of Leith.

5 & 6. GLASGOW.—Veterinary staff—four. Abattoir, meat market and imported food inspection figures are given.

7, 8 & 9. LIVERPOOL.—Veterinary staff—three. Abattoir figures are given. Comparative figures of licensed cowsheds are given for the years 1932-1937, annual figures are given for veterinary examinations in the city cowsheds, for 1932-1937, and a table is included showing the amount of tuberculous milk sent in from the surrounding counties during 1936 and 1937.

				Meat Inspection		Notifiable Diseases (Still prevalent)					
7	8	9	10	11	12	13	14	15	16	17	18
Census	Samples Tested for TB.	No. Tuberculous	No. of Tuberculous Udders	Tuberculous Bovines	Tuberculous Pigs	Bovine Tuberculosis (including item 10)	Anthrax	F. & M. Disease	Swine Fever	Mange	Sheep Scab
359	457	39	1	279	13	2					
991				412	202	5					
685	220	27	2	1,037	579	14					
460	288	23	12	2,283	101	14	2			14	
214			2	1,718	155	68	3	1	4		
888			4	2,429	150	79	1		11		
230	487	6	60	4,985		88	1				
070	1,016	84	64	5,389	3,773	84	1				
070	274	31	30			65	3		1		
450	1,043	105	6								
				830	140	8	2		7	5	
477	14	3	2	216	69	4					
410	448	42		226	28	17	1				
	496	44							47		
095	785	40	20	299	77	66		1			
	56	4		677	1,072						

efers to cows within the urban district.

10 & 11. Manchester.—Veterinary staff—one. The report includes abattoir figures, and a table showing the extent of TB. in milk from 1901-1937.

12. Newcastle.—Veterinary staff—one. Abattoir figures are given, and the 1920-1937 figures are given of diseases in cows in the city, outbreaks of notifiable diseases in the city, and beef carcasses condemned.

13. Preston.—Veterinary staff—one. Abattoir figures are included, and statistics are given of animals examined at markets, for 1933-1937.

14. Salford.—Veterinary staff—one. The report includes abattoir figures, and the figures of tuberculous milk sent in from the surrounding counties during 1927-1936.

15. Stoke-on-Trent.—Veterinary staff—one. Abattoir figures are given.

16. West Ham.—Veterinary staff—two. Several tables of abattoir and meat inspection figures are given.

GREAT BRITAIN. (1938). **Statistical and General Report of the Army Veterinary Services, 1937-1938.** [MURRAY, C. A.] pp. 24. 10 tables. London: The War Office. [8vo.]

GENERAL.—The actual numbers, and the percentages of total strength, of admissions for treatment and of deaths among army horses and mules in the United Kingdom and Egypt are given, together with wastage due to castings for veterinary and other reasons.

There is nothing in the report calling for special notice except, perhaps, the great reduction in the number of animals dealt with, due to the mechanization of the Army.

EDUCATION.—No courses of instruction were held at the Army Veterinary School in Aldershot during the year, and only 21 farriers were trained at the School of Farriery.

RESEARCH.—The Laboratory continued the routine examination of specimens and the production of vaccines and biological products.—F. J. ANDREWS.

INDIA. (1937). **Agriculture and Animal Husbandry in India, 1935-36.** pp. 411. 2 plates, 19 tables, 1 map, 15 appendixes. Delhi: Manager of Publications. [4to] [Rs. 4-10] [7s. 9d.]

ANIMAL CENSUS.—The census of livestock taken in January, 1935, showed an increase in cattle and buffaloes and in goats, and a decrease in sheep. In British India alone, there were 125 million cattle and 34 million buffaloes, 25 million sheep, 37 million goats, 1½ million horses and ponies, 1½ million mules and donkeys and 600,000 camels. The value of exports of animals and animal products exceeded that of imports by over Rs. 90,000,000.

ANIMAL DISEASES.—Mortality among cattle from contagious disease was high, and of the 250,000 reported deaths, 55% were due to RINDERPEST. Against this disease 3,000,000 animals were inoculated, the "goat-tissue" virus being used in 57% and goat-blood virus in 12% of cases. SURRA was proved to be the cause of heavy mortality among cattle in some parts of India.

ANIMAL HUSBANDRY.—More interest in the improvement of livestock was taken in the provinces, particularly in the north, where the number of approved bulls at stud and the number of castrations of scrub bulls showed a steady increase.

RESEARCH.—Investigations were continued into the diseases of sheep, goats and poultry, and the appointment of a research officer was announced for systematic research on poultry diseases.

EDUCATION.—There were 522 students under instruction at the five colleges at the end of the year. 116 students passed the final examinations during the year. Madras University has recognized the Madras Veterinary College as a College of the University, and grants a degree of Bachelor of Veterinary Science.

FINANCE.—The expenditure of the Central and Provincial Veterinary Departments, details of which are given, showed a small increase, but the allotment is still quite inadequate for the needs of the country.—F. J. ANDREWS.

INDIA, ASSAM. (1937). **Report of the Civil Veterinary Department for the Year 1936-37.** [GHOSE, S. C.] pp. 35 + 2. 14 tables. Shillong: Assam Govt. Press. [8vo] [As 10] [1s.]

STAFF.—In addition to one Veterinary Investigation Officer, there were four Veterinary Inspectors, one (temporary) Johne's Disease Officer, and 60 Veterinary Assistant Surgeons.

FINANCE.—The total expenditure was Rs. 183,894.

ANIMAL DISEASES.—In equines, GLANDERS was reported from one district

only ; ANTHRAX and SURRA were also encountered. In bovines most of the common diseases were encountered, *e.g.* RINDERPEST, FOOT AND MOUTH DISEASE, and HAEMORRHAGIC SEPTICAEMIA. The deaths of 260 dogs from RABIES were reported.

PREVENTIVE INOCULATION.—ANTHRAX and HAEMORRHAGIC SEPTICAEMIA inoculations were also carried out. 111,859 animals were vaccinated against RINDERPEST with goat virus, with a mortality of 1·1 %. CONTAGIOUS ABORTION of cattle and NEWCASTLE DISEASE of fowls were detected for the first time.

HOSPITALS AND DISPENSARIES.—The work of the Veterinary Hospitals at Gauhati, Silchar and Shillong is shown in a table. 6,094 animals were treated, and 499 castrations were performed.

SPECIAL INVESTIGATIONS.—The Veterinary Investigation Officer carried out work on 13 common local diseases during the year, particular attention being given to JOHNE'S DISEASE.

EDUCATION.—Four students from the Province were under training at the Bengal Veterinary College at Calcutta.—R. FISHER.

INDIA, BALUCHISTAN. (1938). **Report on Animal Diseases.**—*Adm. Rep. Baluchistan Agency, 1936-1937.* pp. 126-132 and 135. 7 tables.

All the information given is set out in a number of tables.

CONTAGIOUS DISEASE.—There were 500 deaths in eight outbreaks of ANTHRAX, 260 deaths in 12 outbreaks of BLACKLEG, 33 deaths in two outbreaks of RINDERPEST, 108 deaths in 66 outbreaks of FOOT AND MOUTH DISEASE, and 800 deaths in 24 outbreaks of SHEEP POX ; 1,500 goats died of SCAB. No RABIES was reported.

PREVENTIVE INOCULATIONS.—2,750 cattle were inoculated against BLACKLEG and 160 against RINDERPEST. 230 sheep were inoculated against ANTHRAX and 1,200 against SHEEP POX.

HOSPITALS AND DISPENSARIES.—The total number of animals treated was 32,000 (450 in-patients and 31,500 out-patients), and 360 castrations were performed. 64,000 animals were treated by veterinary staff on tour, and 122 animals were castrated.—F. J. ANDREWS.

INDIA, BENGAL. (1938). **Annual Report for the Civil Veterinary Department for the Year ending June, 1937.** [KERR, P. J.] pp. 50. 2 figs., numerous tables and appendixes. Alipore : Bengal Govt. Press. [8vo] [As 4 or 6d.]

STAFF.—Nine veterinary assistant surgeons were appointed, bringing the total staff to 150.

ANIMAL DISEASES.—The mortality total again increased despite a decline of about 9,000 in the deaths from RINDERPEST, which remained wide-spread. Goat tissue vaccine was alone used and is considered to have been responsible for the lower mortality reported. If sufficient staff had been available, more vaccinations would have been performed. There was a slight decrease in FOOT AND MOUTH DISEASE, but considerable increases in ANTHRAX, HAEMORRHAGIC SEPTICAEMIA and BLACKLEG. PARASITIC DIARRHOEA caused a considerable mortality among goats in Malda.

PREVENTIVE INOCULATIONS.—292,656 animals received goat tissue vaccine, and 745 government bulls received serum-simultaneous inoculations against RINDERPEST. 4,689 animals were vaccinated against ANTHRAX.

HOSPITALS AND DISPENSARIES.—10,991 animals were castrated and 117,640 animals were treated at 56 dispensaries or by veterinary assistants on tour.

SPECIAL INVESTIGATIONS.—Ten out of 127 cattle reacted positively to the double intradermal tuberculin test. BOVINE BRUCELLOSIS was found to be spreading among imported Jersey cows. Losses of calves due to DYSENTERY were found to

be associated with infection by *Trichomonas ruminantium*, *Embadomonas* and *Eimeria zürnii*. Night blindness and OPHTHALMIA in newly-weaned calves was ascribed to avitaminosis-A and was prevented by giving cod liver oil. Notes on other diseases under investigation are included.

EDUCATION — BENGAL VETERINARY COLLEGE. [MACGREGOR, A. D.] — 184 students were under instruction, and 41 (65% of the candidates) passed their final examination. The Raymond Research Laboratory continued to carry out routine pathological work.—R. FISHER.

INDIA, BIHAR. (1938). **Annual Report of the Civil Veterinary Department for the Year 1936-1937.** [RILEY, P. B.] pp. iv + 30 + xxxix + 4. 14 tables, 1 map. Bihar: Supt. Govt. Printing. [8vo] [Rs 1-3-0].

STAFF.—The total staff numbered 138 and the budget was Rs 7.03.740.

ANIMAL DISEASES.—All the principal indigenous contagious diseases were present. The virulence of RINDERPEST and HAEMORRHAGIC SEPTICAEMIA was greater than during the previous year.

PREVENTIVE INOCULATIONS.—5,165 animals were given ANTHRAX antiserum, 27,784 HAEMORRHAGIC SEPTICAEMIA antiserum and 77,261 RINDERPEST antiserum, whilst goat tissue RINDERPEST virus was used on 348,087 animals.

HOSPITALS AND DISPENSARIES.—97,225 animals were treated and 104,998 castrations were performed at the 29 hospitals or by veterinary staff on tour.

SPECIAL INVESTIGATIONS.—Investigations were carried out by the Veterinary Investigation Officer on rinderpest, Johne's disease, surra, sterility, and abortion in cattle, and on anthrax and encephalomyelitis in horses.

EDUCATION—BIHAR VETERINARY COLLEGE. [DAVIS, R. T.]—Thirteen students attended during the year. 3,565 animals were treated in the College hospital. In the research laboratory the viability of RINDERPEST virus was studied.—R. FISHER.

INDIA, BOMBAY PRESIDENCY. (1938). **Annual Administration Report of the Civil Veterinary Department for the Year 1936-1937.** [FARBROTHER, E. S.] pp. 50. 17 tables. Bombay: Govt. Central Press. [8vo] [As 3 or 4d.]

STAFF.—There were three veterinary inspectors and 129 veterinary assistant surgeons on the staff.

ANIMAL DISEASES.—ANTHRAX, HAEMORRHAGIC SEPTICAEMIA and BLACKLEG were reported in cattle, and STRANGLES in horses; TRYPANOSOMIASIS occurred in both horses and cattle. There were 513 outbreaks of FOOT AND MOUTH DISEASE and 1,334 outbreaks of RINDERPEST; 79,273 cattle were attacked by these diseases, and 34,542 died. In other animals, RABIES, SHEEP POX and various fowl diseases occurred.

PREVENTIVE INOCULATIONS.—504 cattle were vaccinated against HAEMORRHAGIC SEPTICAEMIA and 12,147 against BLACKLEG, and 295,730 doses of RINDERPEST goat virus vaccine were prepared.

HOSPITALS AND DISPENSARIES.—112 of these are maintained, and there is also one travelling dispensary belonging to the S.P.C.A. 30,000 animals were treated, and 32,500 castrated.

EDUCATION—BOMBAY VETERINARY COLLEGE. [PHADKE, V. R.]—113 students attended the classes at the College; of these, 11 passed the final year examination. Clinical instruction was given at the Bai Sakarbai Dinshaw Petit Hospital for Animals and at the Laboratory. The Ninth All-India Veterinary Congress was held at the College.

BOMBAY CITY AND HARBOUR DEPARTMENT. [PHADKE, V. R.]—3,221 horses were imported. One case of EPIZOOTIC LYMPHANGITIS was destroyed, and five cases of SURRA were successfully treated with naganol. Six suspected cases of GLANDERS were reported.—R. FISHER.

INDIA, CENTRAL PROVINCES AND BERAR. (1938). **Annual Report of the Civil Veterinary Department for the year ended March 31st, 1937.** [GAREWAL, J. S.] pp. 28. 14 tables, 1 appendix. Nagpur: Govt. Printing. [8vo] [Rs 1-8-0].

STAFF.—The staff numbered 163.

ANIMAL DISEASES.—Apart from a relatively small number of cases of ANTHRAX, HAEMORRHAGIC SEPTICAEMIA, BLACKLEG, TRYPANOSOMIASIS and PIROPLASMOSIS, 1,765 outbreaks of RINDERPEST and 1,725 outbreaks of FOOT AND MOUTH DISEASE were recorded.

PREVENTIVE INOCULATIONS.—11,088 animals were given anthrax antiserum, 164,000 were immunized against H.S., and 38,377 against blackleg. A centre for the preparation of goat and tissue rinderpest virus was opened during the year, and 405,320 doses of goat virus and 19,900 doses of the tissue vaccine were issued.

HOSPITALS AND DISPENSARIES.—Cases treated numbered 238,330, and castrations, 24,367. One hundred outlying dispensaries were operating during the year. Veterinary assistants on tour treated an additional 560,000 animals and castrated 143,152 animals.

EDUCATION.—Scholars from the Province were under training at the Bombay Veterinary College.—R. FISHER.

INDIA, MYSORE. (1938). **Annual Administration Report of the Civil Veterinary Department for the Year 1936-37, with the Government Review thereon.** [KRISHNIENGAR, K.] pp. 14. 3 tables, 1 map, 7 appendixes. [fcp].

ANIMAL DISEASES.—There were 1,414 outbreaks of ANTHRAX, 456 of HAEMORRHAGIC SEPTICAEMIA, 1,260 of BLACKLEG, 106 of RINDERPEST, and 230 of SHEEP POX.

PREVENTIVE INOCULATION.—19,992 animals were immunized against ANTHRAX, 30,350 against HAEMORRHAGIC SEPTICAEMIA, 88,095 against BLACKLEG and 38,520 against RINDERPEST (by goat virus). 41,115 sheep were immunized against SHEEP POX.

HOSPITALS AND DISPENSARIES.—At 72 dispensaries, 472,112 animals were treated and 26,500 animals castrated.

SPECIAL INVESTIGATIONS.—Various types of johnin were compared, and a local type is being standardized for use. Work was also done on the treatment of TRYPANOSOMIASIS, parasitic diseases, sterility (hormone treatment) and poultry diseases.—R. FISHER.

INDIA, PUNJAB. (1937). **Annual Report of the Civil Veterinary Department for the Year 1936-37.** [QUIRKE, T. F.] pp. ii + 41 + xxii. 10 figs. on 3 plates, numerous tables, 1 map, 6 diagrams. Lahore: Supt, Govt. Printing. [8vo] [As 4].

ADMINISTRATION.—The veterinary staff numbered 21 superintendents and 393 assistants, and the expenditure was Rs. 21,47,472.

ANIMAL DISEASES.—The total disease mortality recorded was 31,063. No case of ANTHRAX was recorded. Fourteen cases of GLANDERS were destroyed. HAEMORRHAGIC SEPTICAEMIA occurred in all districts except Simla, and was responsible

for 63% of a total bovine mortality. BLACKLEG appeared in 18 districts. There were 3,762 cases of SURRA. RINDERPEST occurred in all districts except Simla. FOOT AND MOUTH DISEASE appeared in 18 districts.

PREVENTIVE INOCULATIONS.—537,789 animals were vaccinated against H.S. and 21,138 against blackleg, 169,116 were actively immunized against rinderpest and 58,917 cattle given rinderpest antiserum.

ANIMAL BREEDING.—The stock farm at Hissar is the largest breeding establishment in India. An increase in both the stock held and the stock issued is recorded. Hitherto draught oxen have been mainly developed, but now milch cows are being encouraged. There are also successful sheep, goat and donkey breeding sections. The farm is a valuable centre for disease research. Experimental fodder crops are also grown.

HOSPITALS AND DISPENSARIES.—There were 300 veterinary hospitals and an increase of 37 had been sanctioned. 1,637,507 animals were treated, and 271,789 animals castrated at dispensaries or by veterinary assistants on tour.

EDUCATION. PUNJAB VETERINARY COLLEGE. [TAYLOR, W.]—There were 133 students at the Punjab Veterinary College during the year.

SPECIAL INVESTIGATIONS.—Accounts of the work of the hospital and pathological and parasitological sections are described. The use of naganol in artificial infections of SURRA in dogs was investigated.—R. FISHER.

SOUTHERN RHODESIA. (1938). **Annual Report of the Division of Entomology for the Year Ended 31st December, 1937.** [CHORLEY, J. K.]—*Rhod. agric. J.* **35.** 659-676.

Native cattle possess some degree of resistance to TRYPANOSOMIASIS and numerous natural recoveries take place, but such cases may " break down " under adverse conditions such as overwork, or if they contract some other disease : these deaths from TRYPANOSOMIASIS may occur many miles from the district where infection took place.

The policy of controlled and intensive game destruction with the object of creating a game-free buffer zone between the " fly " and the settlements has proved successful in stopping the advance of " fly " in all areas where it has been applied. It is considered that tsetse can be eradicated locally by a cautious extension of this policy in all tsetse fly areas without exterminating the game. The cost, both financial and ethical, has been great, and is an ever mounting total, and the question of reclaiming this land for which at the moment there is no immediate want is one which will soon demand an answer.—J. A. GRIFFITHS.

UNITED STATES OF AMERICA. (1937). **Annual Report of the Surgeon General of the Public Health Service of the United States for the Fiscal Year 1937.** pp. vi + 164. Numerous tables, 1 chart, 2 photographs. Washington : United States Govt. Printing Off. [8vo] [60 cents].

The Division of Zoology carried out research on :- (1). TRICHINOSIS.—A new technique for ascertaining the number of trichina larvae produced by one female was elaborated. A report was published on the relationship between trichinosis in man and in pigs. Reference is made to the use of a skin test and of the precipitin test in the diagnosis of the disease in man. (2). AMOEBIASIS.—An investigation on the various sizes of cyst found was made. Dogs were infected with trophozoites. —J. C. WALLACE.

BOOK REVIEWS.

FELDMAN, W. H. [D.V.M., M.S. ; Associate in Division of Experimental Medicine, Institute of Experimental Medicine ; Associate Professor of Comparative Pathology, Mayo Foundation for Medical Education and Research, Graduate School, University of Minnesota]. (1938). **Avian Tuberculosis Infections.** pp. ix + 483. 109 figs., 17 tables. [Numerous refs.] London : Baillière, Tindall and Cox. [8vo] [31s. 6d.]

The author enjoys a wide reputation as an authority on avian TB. and has contributed many scientific articles of great value. He is, therefore, singularly well qualified to present a treatise on this subject.

The importance of this disease to the veterinarian is becoming increasingly apparent, but much of the recent information is scattered through the literature and is not readily accessible to the ordinary reader. His book therefore serves a most useful purpose, largely because he has collected into one volume all the important data relating to this subject.

The book is divided into 13 chapters and covers a wide field. It deals with the isolation and cultural characters of the organism, natural and experimental TB. in birds, and the pathogenicity of the bacillus for other species. In view of the importance of infection of cattle and pigs with *Mycobacterium tuberculosis avium*, a considerable section of the book is devoted to the significance of the organism in these species ; in this realm his views are orthodox and most instructive.

It is natural that in many places he deals extensively with general observations on the tubercle bacillus and has not confined his attention to the avian type in particular. In the opinion of the reviewer this approach to the subject does not detract from the value of the monograph ; indeed, in many respects it enhances its usefulness. Nevertheless, it may be suggested that in some places there is needless repetition. Thus, on pp. 130 *et seq.* the lesions of experimental TB. in the chicken are described in considerable detail and again in chapter VII ; while the changes induced in the g. pig are cited at length on pp. 127 *et seq.* and also on pp. 246 *et seq.* Other instances of redundancy could be mentioned.

The illustrations are clear and carefully chosen, and typify the various conditions they were selected to portray : in addition, each chapter is exceedingly well documented. The book can be warmly recommended both to the practitioner and to the laboratory worker.—R. E. GLOVER.

NIEBERLE, K. [Dr. med. vet. o. Professor und Direktor des Veterinär-Pathologischen Institutes der Universität Leipzig]. (1938). Tuberkulose und Fleischhygiene. **[TB. and Meat Hygiene].** pp. viii + 100. 38 text figs., 40 figs. on 20 plates. Jena : Gustav Fischer. [8vo] [RM. 6].

This book represents an attempt to bring together within 100 pages of text the most important advances of recent years in our knowledge of the pathological anatomy and pathogenesis of TB. in domestic animals, and to apply this knowledge to the practice of meat inspection. In particular, those forms of TB. are considered in which authors have shown that infection of the meat with tubercle bacilli occurs. In a country in which a considerable amount of raw and partly cooked meat is consumed, this is clearly a matter of importance.

The first chapter deals in general with the reaction of the tissues of animals to tubercle bacilli, and shows briefly the variation in reaction in animals of different species infected with the same type of tubercle bacillus, and of animals within the same species infected with tubercle bacilli of different types, *e.g.* TB. in pigs due to bovine and avian bacilli.

The second chapter, of 58 pages, contains a wide study of primary infection and reinfection and their possible results. This represents a summary of the work already published by the author and his colleagues in a large number of papers during recent years [abstracted elsewhere in this *Bulletin*].

The third and last chapter includes the results of the bacteriological examination of meat carried out by Professor MEYN on selected cases of TB., by direct culture on Petragnani's medium and by g. pig inoculation. Out of a large number of cases, 80% of positive results were obtained. In histological sections it was frequently possible to demonstrate the presence of a tubercle bacillaemia, and this is illustrated by photographs.

The recommendations relating to meat inspection are those contained in the papers by the author and by VAN OYEN read at the 1938 International Veterinary Congress.

The natural colour photographs are the finest which we have seen in any text, and include the most characteristic lesions of bovine TB. No references are given, nor is there an index. The book should be in the hands of all who are interested in the problem of TB., whether research worker, meat inspector or general practitioner.—E. G. WHITE.

URBAIN, A. [Professeur au Muséum national d'histoire naturelle]. (1938). La réaction de fixation dans les tuberculoses humaines et animales. [**Complement-Fixation in Human and Animal TB.**] pp. 146. 15 tables. [Numerous refs.] Paris : Masson et Cie. [2nd Edit.] [8vo] [Fr. 28].

The technique of the c.-f. test is explained in a clear and simple manner ; the modifications of several workers are discussed and each method is described in detail. In this respect the book should be of value to the laboratory worker.

A chapter is devoted to a comparison of the c.-f. test with the serum flocculation test ; it is shown that these tests may be complementary to each other in the diagnosis of human TB.

From the statistics furnished by the author, the c.-f. test is seen to be very accurate in the diagnosis of many human tuberculous conditions ; conversely the test is correspondingly accurate in non-tuberculous human subjects.

The results of numerous investigations upon the application of the test to animal TB. are cited. Although the test is accurate in a high percentage of instances, an allergic response by this method is not always present in cases with calcified and caseating lesions. In this respect the test is not so sensitive as the intradermal test. The numbers of poultry examined are too few for any definite conclusions to be drawn.

The bibliography is very extensive.—E. C. HULSE.

UEBERREITER, O. [Editor]. (1938). Fortschritte der neuzeitlichen Veterinärchirurgie. Festschrift Theodor Schmidt zu seinem Siebzigsten Geburtstage gewidmet von seinen Schülern und Freunden. [**Advances in Modern Veterinary Surgery. Festschrift to Theodor Schmidt on his 70th Birthday**]. pp. 232. 87 figs., 2 tables. [Numerous refs.] Berlin & Vienna : Verlag von Urban & Schwarzenberg. [8vo] [RM. 12].

This Festschrift takes the usual form of a collection of technical papers contributed by former pupils and friends of the recipient. In this case there are 25 papers on surgical technique and pathology. [Abstracts of the latter appear elsewhere in this *Bulletin*].—J. E.

INDEX VETERINARIUS

The publication of *Index Veterinarius* commenced with the indexing of the literature of 1933. It is a complete index of current publications relating to veterinary research, public health, administration, education and other aspects of veterinary science.

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